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L21: Entry 36 of 43 File: USPT Dec 7, 1999

US-PAT-NO: 5999918
DOCUMENT-IDENTIFIER: US 5999918 A

TITLE: Interactive color confidence indicators for statistical data

DATE-ISSUED: December 7, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Williams; James Benjamin	Sherborn	MA		
Lyness; Stanley W.	Sharon	MA		
Gadenne; Francois G.	Marblehead	MA		
Fox; William J.	Wayland	MA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Rational Investors, Inc.	Cambridge	MA			02

APPL-NO: 08/ 828911 [PALM]
DATE FILED: April 2, 1997

INT-CL: [06] H04 N 7/12

US-CL-ISSUED: 705/36; 702/179, 702/180, 702/181, 705/35
US-CL-CURRENT: 705/36; 702/179, 702/180, 702/181, 705/35

FIELD-OF-SEARCH: 705/35, 705/36, 358/530, 702/179, 702/180, 702/181, 345/326

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
4868766	September 1989	Oosterholt	345/420
4896291	January 1990	Gest et al.	345/353
4930010	May 1990	MacDonald	358/530
4943938	July 1990	Aoshima et al.	345/422
5132899	July 1992	Fox	705/36
5148365	September 1992	Dembo	364/402

☐	5167010	November 1992	Elm et al.	706/45
☐	5185696	February 1993	Yoshino et al.	705/36
☐	5220500	June 1993	Baird et al.	705/36
☐	5222019	June 1993	Yoshino et al.	705/36
☐	5228119	July 1993	Milhalisin et al.	345/418
☐	5245535	September 1993	Weiss et al.	705/36
☐	5251131	October 1993	Massand et al.	364/419.08
☐	5333247	July 1994	Gest et al.	345/438
☐	5374924	December 1994	McKiel, Jr.	340/825.19
☐	5452406	September 1995	Butler et al.	345/426
☐	5452413	September 1995	Blades	345/349
☐	5454104	September 1995	Steidlmayer et al.	707/4
☐	5473745	December 1995	Berry et al.	345/340
☐	5499319	March 1996	Sultan et al.	706/1
☐	5511157	April 1996	Wang	345/437
☐	5521814	May 1996	Teran et al.	364/528.01
☐	5542039	July 1996	Brinson et al.	345/326
☐	5673402	September 1997	Ryan et al.	395/238
☐	5752236	May 1998	Sexton et al.	705/4

OTHER PUBLICATIONS

William F. Sharpe Stanford University, Mean, Variance and Distributions, Excerpt from onine textbook published on Internet Sep. 11, 1995 Internet.
Press Release by Simon Public Relations Group for AExpert, Inc., Program Based on Nobel Prize-Winning Modern Portfolio Theory Provides Investors with Expert Research at Their Fingertips, "Expert Optimizer Helps Investors Make the Most of Their Mutual Fund Decisions" May 15, 1996 Philadelphia, PA.
Press Release by Simon Public Relations Group for AExpert, Inc., Company Delivers Vast Collections of Information to Investors and Financial Advisors Via Their Computer Screens, AExpert Inc. Brings the Tools of the Financial World Right to User's Fingertips May 15, 1996 Philadelphia, PA.
Biography on Kenneth S. Ray, Chairman and CEO of AExpert, Inc.
Randy Neumann, "The Modern Portfolio Theory and Law", Tuesday, Mar. 26, 1996 Access Financial Planning.
Robert B. Gillam, Spring 1996 Money Manage Review Guest Interview.
James M. Little, "A Changing Marketplace"Spring 1996 Metals in the News.
Union Bank of Switzerland, Mar. 1996 International Equity Markets from the Perspective of a Swiss Franc Investor.
The Vanguard Retirement Planner, Vanguard Marketing Corporation, Distributor, pp. 1-20, 1995.
Peter Coffee, Karen Moser, Superb Interactive Functions, Market Engineering Corp. Crystal Ball 1.0.3, 1989.
Robin Nelson, Forecast Pro for Windows Ver 1.00A:business forecasting for the non-statistician, Business Forecast Systems Inc.'s Forecasting statistical Software package, 1992.

ART-UNIT: 271

PRIMARY-EXAMINER: Poinvil; Frantzy

ASSISTANT-EXAMINER: Alvarez; Raquel

ATTY-AGENT-FIRM: Stretch; Maureen

ABSTRACT:

A computer interface system that includes interactive interface controls as well as aural and kinetic interface controls to assist in educating a user, in profiling a user, and in controlling and monitoring the implementation of actions involving probabilistic distributions. The system allows the user to indicate, either directly or indirectly, a confidence level that he or she desires for actions such as investments, as well as other characteristics and constraints. The user is able to manipulate the interface controls to evaluate results in terms of confidence and risk. If the user approves the results and his or her profile, in a preferred embodiment the selections are transmitted to effectuate an action.

14 Claims, 36 Drawing figures

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L21: Entry 39 of 43 File: USPT Jul 21, 1998

US-PAT-NO: 5784696
DOCUMENT-IDENTIFIER: US 5784696 A

TITLE: Methods and apparatus for evaluating portfolios based on investment risk

DATE-ISSUED: July 21, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Melnikoff; Meyer	Verona	NJ	07044	

APPL-NO: 08/ 471605 [PALM]
DATE FILED: June 6, 1995

PARENT-CASE:
CROSS REFERENCE TO RELATED APPLICATION This application is a continuation-in-part of copending U.S. patent application Ser. No. 08/393,910, filed Feb. 24, 1995.

INT-CL: [06] G06 F 17/60

US-CL-ISSUED: 705/36
US-CL-CURRENT: 705/36

FIELD-OF-SEARCH: 395/236, 395/235, 705/36, 705/35

PRIOR-ART-DISCLOSED:

OTHER PUBLICATIONS

W.F. Sharpe, Fianancial Analysts Journal, pp. 10-11, Abstract No. D85002332 (INSPEC.), May-Jun. 1985.

ART-UNIT: 241

PRIMARY-EXAMINER: Hayes; Gail O.

ASSISTANT-EXAMINER: Oh; Junghoon Kenneth

ATTY-AGENT-FIRM: Fish & Neave Ingerman; Jeffrey H. Lele; Avinash S.

ABSTRACT:

A portfolio selector for selecting an investment portfolio from a library of assets based on investment risk and risk-adjusted return is provided. The selector chooses a tentative portfolio from the library and determines a risk-adjusted return for the portfolio. The risk-adjusted return is computed by subtracting the average of multiple segment shortfalls from the average of multiple segment performances, over the same segments, based on analysis of market value data for the assets in the

portfolio and for a baseline asset. The asset selection and computation is repeated until the risk-adjusted return of the portfolio satisfies criteria derived from preference data specific to an investor. A data storage medium encoded with instructions for performing the method is also provided.

19 Claims, 34 Drawing figures

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L15: Entry 11 of 17 File: USPT Aug 21, 2001

US-PAT-NO: 6278981
DOCUMENT-IDENTIFIER: US 6278981 B1
** See image for Certificate of Correction **

TITLE: Computer-implemented method and apparatus for portfolio compression

DATE-ISSUED: August 21, 2001

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Dembo; Ron Samuel	Ontario			CA
Kreinin; Alexander Yacov	Thornhill			CA
Rosen; Dan	Toronto			CA

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Algorithmics International Corporation	Ontario			CA	03

APPL-NO: 09/ 084923 [PALM]
DATE FILED: May 28, 1998

PARENT-CASE:
This application claims priority to Provisional Application No. 60/057,927, filed May 29, 1997.

INT-CL: [07] G06 F 17/60

US-CL-ISSUED: 705/36
US-CL-CURRENT: 705/36

FIELD-OF-SEARCH: 705/36, 705/37

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	4346442	August 1982	Musmanno	364/408
☐	4642768	February 1987	Roberts	364/408
☐	4674044	June 1987	Kalmus et al.	364/408
☐	4694397	September 1987	Grant et al.	364/408

☐	4722055	January 1988	Roberts	364/408
☐	4744026	May 1988	Vanderbei	364/402
☐	4744027	May 1988	Bayer et al.	364/402
☐	4744028	May 1988	Karmarkar	364/402
☐	4752877	June 1988	Roberts et al.	364/408
☐	4797839	January 1989	Powell	364/554
☐	4953085	August 1990	Atkins	364/408
☐	5148365	September 1992	Dembo	364/402
☐	5774880	June 1998	Ginsberg	705/36
☐	5799287	August 1998	Dembo	705/36
☐	5893079	April 1999	Cwenar	705/36

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
90890169	May 1990	EP	
0 573 991 A1	December 1993	EP	
0 686 926 A2	December 1995	EP	
890213953	February 1991	JP	
890240605	April 1991	JP	
890328405	August 1991	JP	
WO 92 15064	September 1992	WO	
PCT/US92/02163	September 1992	WO	
WO 98/54666	December 1998	WO	

OTHER PUBLICATIONS

Spinner, Karen, "Growing Pains," Derivatives Strategy, pp. 6-7, Oct. 1996.*
Walker, Richard. "The Greatest Challenge". ICB, pp. 2-4, 1998-1999.*
Webb, Andrew. "VAR's Bean-Counter Dilemma". Treasury & Risk Management Technology Buyers' Guide, vol. 8, No. 6, pp. 53-54, 56, 1998.*
Spinner, Karen. "Hedging Credit, Market Risk". Wall Street & Technology Product Digest Supplement, pp. 23-25, Spring 1998.*
Groenfeldt, Tom. "Managing Risk in Real-Time: Is It Worthwhile?". Bank Technology News, Dec. 1, 1997.*
"Algorithmics Announces RiskWatch Release 3.0," PR Newswire, Jun. 1997.*
"Clptimization As A Tool In Finance," Proceedings of the IEEE/IAFE 1997, pp. 64-70, Conference held Mar. 24-25, 1997.*
"Optimization as a Tool in Finance," Proceedings of the IEEE/IAFE 1997, p. 64, Conference held Mar. 24-25, 1997.*
Dembo, Ron & Dan Rosen, "The Practice of Portfolio Replication," Algorithmics Technical Paper Series, 1997.*
Cover, T.M., "Universal Data Compression and Portfolio Selection," IEEE Comput. Soc. Press, Proceedings from the 37th Annual Symposium, 1996.*
"37th Annual Symposium on Foundations of Computer Science," IEEE Computer Society Press, Held Oct. 14-16, 1996.*
"Six Stanford Faculty Elected to National Academy of Engineering," Business Wire, Mar. 1995.*

"The Cafe Behind the Hedge," Open Finance: The Financial Newsletter from Sun Microsystems, Summer 1992.
"DeRosa ARBS Japanes Warrants Against Nikkei Options," Derivatives Week, May, 4, 1992, at 2.
Nailene Chou Wiest, "Portfolio Insurance Gains Favor in FX Management," BC Cycle, Apr. 6, 1992.
Ron S. Dembo and Alan J. King, "Tracking Models and the Optimal Regret Distribution in Asset Allocation," 8 Applied Stochastic Models and Data Analysis 151-157 (1992).

Ron S. Dembo, "Scenario Optimization," 30 Annals of Operations Research 63-80 (1991).
Ron Dembo and Izzy Nelken, "Share the Load," Risk, Apr. 1991.
Craig Torres, "Mathematicians Race to Develop New Kinds of Trading Instruments," The Wall Street Journal, Oct. 18, 1991.
Daniel Stoffman, "The Hedging Hotshot of Bay Street," Canadian Business, Dec. 1990, at 56-59.
Craig Torres, "Synthetic Stock: Future Stand-In for the Real Thing," The Wall Street Journal, Oct. 19, 1990.
Peggie R.Elgin, "Portfolio Hedging Emerges in New Forms to Shield Investments," Corporate Cashflow Magazine, Oct. 1990, at 22.
Saul Hansell, "Is the World Ready for Synthetic Equity," Institutional Investor, Aug. 1990, at 54.
Ron Dembo, "The Art of the Optimum," Risk, Apr. 1990, at 17-21.
Ron Dembo and Parvez Patel, "Protective Basket," Risk, Feb. 1990, at 25-28.
Jon Stein, "Where Corporate Treasurers Can Look for Software Help," Futures, Oct. 1989, at 50.
Mark Voorhees, "Pension Management," Institutional Investor, Jan. 1988, at 57.
Trudy Ring, "Wells Fargo Gets Most New Business in Dynamic Hedging," Pensions and Investment Age, Feb. 9, 1987, at 31.
Lewis Koflowitz, "Hedging Tools Provide Portfolio Security Blanket," Wall Street Computer Review, Mar., 1989, at 43.
Salman Azhar et al., "Data Compression Techniques for Stock Market Prediction," Proceedings of the 1994 IEEE Data Compression Conference, Snowbird, Utah, Mar. 29-31, 1994, at 72-82.
R. Dembo and D. Rosen, The Practice of Portfolio Replication, Algorithmics Tech. Paper No. 98-01 (1997).
Planned Supplement to the Capital Accord to Incorporate Market Risks, Basle Committee on Banking Supervision, Bank of International Settlements, Basle, No. 16 (Apr. 1995).
Phillipe Jorion, Value at Risk: The New Benchmark for Controlling Derivatives Risk, 185-203 (Irwin Professional Publishing 1997).
John C. Hull, Options, Futures and Other Derivatives (3E), 416-31 (Prentice-Hall 1997).
Harry Markowitz, Portfolio Selection, The Journal of Finance, vol. 7, No. 1, 77-91 (1952).
W.F. Sharpe, Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, The Journal of Finance, vol. 19, No. 3, 425-42 (1964).
RiskMetrics.TM. Technical Document, Morgan Guarantee Trust Co. Global Research (4th ed. 1996).
Ron Dembo et al., Analytical Compression of Portfolios and VaR, Algorithmics Tech. Paper No. 96-01 (1997).
Mark B. Garman, Issues and Choices in Analytic (Variance-Covariance) Value at Risk (presented at the RIMAC 97 Conference, Scottsdale, Arizona, Feb. 1997).
Black et al., The Pricing of Options and Corporate Liabilities, Journal of Political Economy, 637-55 (1973).
C. Albanese and L. Seco, Harmonic Analysis in Value at Risk Calculations, Working Paper, RiskLab-Univeristy of Toronto (1996) (accepted for publication in Finance and Stochastics).

ART-UNIT: 213

PRIMARY-EXAMINER: Hafiz; Tariq R.

ASSISTANT-EXAMINER: Meinecke-Diaz; Susanna

ATTY-AGENT-FIRM: Kenyon & Kenyon

ABSTRACT:

A computer-implemented method for compressing a portfolio of financial instruments is described. Financial instruments to be compressed are identified, and a compressed subportfolio corresponding to the identified financial instruments is generated. The compressed subportfolio and any non-compressed financial instruments are then combined into a compressed portfolio.

20 Claims, 7 Drawing figures

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L15: Entry 11 of 17 File: USPT Aug 21, 2001

DOCUMENT-IDENTIFIER: US 6278981 B1
**** See image for Certificate of Correction ****
TITLE: Computer-implemented method and apparatus for portfolio compression

Brief Summary Text (2):
The present invention relates generally to the field of data processing, and in particular to a computer-implemented method and apparatus for compressing a portfolio of financial instruments to enable, for example, more efficient risk management processing than is otherwise achievable with an uncompressed portfolio.

Brief Summary Text (3):
Risk management is a critical task for any manager of a portfolio of market instruments, and accurate and efficient risk measurement is at the core of any sound enterprise-wide risk management strategy. Given the relatively-complex mathematical calculations necessary to accurately measure risk, financial institutions generally use some form of computer-implemented "risk management engine." As explained below, however, existing risk management engines may be insufficient to adequately deal with the large, complex portfolios maintained by many financial institutions.

Brief Summary Text (4):
It is not unusual for large and medium-sized financial institutions, such as banks or insurance companies, to require a risk management engine that allows the computation of daily Value-at-Risk (VaR) estimates of an entire portfolio, which may contain several hundred thousand positions, including substantial volumes of complex derivative products such as swaps, caps and floors, swaptions, mortgage-backed securities, and so on. Moreover, these several hundred thousand positions may have to be evaluated over hundreds or even thousands of different scenarios. To further complicate the task, these financial institutions may require decision support tools for managers and traders that allow performance of inter-day calculations in near-real time.

Brief Summary Text (5):
In general, financial institutions are required to measure their overall risks for regulatory purposes and as a basis to manage their capital more efficiently. While the former has been driving the development of risk oversight programs in financial institutions worldwide in the last few years, the latter provides a high value-added to those willing to make the investment. Traditionally, portfolio managers have been using standard deviation and variance to measure their portfolio risk. This practice is based on modern portfolio theory, as described in, for example, Harry Markowitz, Portfolio Selection, The Journal of Finance, vol. 7, no. 1 (1952), and W. F. Sharpe, Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, The Journal of Finance, vol. 19, no. 3 (1964). However, in the last decade, both regulators and businesses have embraced more general (and perhaps more sophisticated) measures such as Value-at-Risk. VaR gives the maximum level of losses that a portfolio could incur, over some predetermined period of time, with a high degree of confidence. For regulatory purposes, for example, the time period may be set to 10 days, and the one-sided confidence interval to 99%. See, e.g., Planned Supplement to the Capital Accord to Incorporate Market Risks, Basle Committee on Banking Supervision, Bank of International Settlements, Basle, No. 16

(April 1995). Although VaR can be expressed as a multiple of the portfolio standard deviation in some simple cases, such as when portfolios are normally distributed, this generally is not the case.

Brief Summary Text (6):
There are different methods available to estimate VaR, depending on the assumptions one is willing to make with respect to the possible future market moves and the complexity of the portfolio. Such methods are described generally in RiskMetrics.TM. Technical Document, Morgan Guarantee Trust Company Global Research (4th ed. 1996), and Phillipe Jorion, Value at Risk. The New Benchmark for Controlling Derivatives Risk (Irwin Professional Publishing 1997). The most generally-applicable method is based on simulation, either historical or so-called "Monte Carlo" simulation. In particular, some simulation may be unavoidable to get an accurate picture of risk when a portfolio contains substantial positions in instruments with optionality, such as options, convertible bonds, mortgages and loans with embedded options. However, given the complexity and computational requirements of known simulation methods, users must trade accuracy for price, time and ease of implementation. Moreover, full simulation of very large and complex portfolios, such as those encountered in many financial institutions today, may not be achievable in a reasonable time period even with top-of-the-line computers. For example, a VaR estimate of a large, complex portfolio over several thousand Monte Carlo scenarios could easily take several hours, if not days, for a top-of-the-line work station. Indeed, even the simple task of loading and storing large portfolios can be onerous and time consuming.

Brief Summary Text (7):
In an effort to address the practical problems associated with risk measurement for large and/or complex portfolios, it is known to adopt an approach in which a subject portfolio (also called the "target" portfolio) is first divided into a "linear" subportfolio and a "non-linear" subportfolio. The former would contain all of the instruments having little or no optionality, while the latter would contain all of the options. In a typical institution, the linear portfolio might comprise 70-95% of the total portfolio positions. However, given their nature, the risks embedded in option positions may be substantial. The next step in such an approach is to measure the risk of these subportfolios separately. For the linear subportfolio, one could apply, for example, a "delta-normal methodology" such as that described in the above-cited RiskMetrics.TM. Technical Document. By assuming linearity of the subportfolio and normal distributions, this analytical method has moderate computational requirements. For the options, some basic, perhaps limited, simulation can be applied. Finally, an estimate of the risk of the target portfolio is taken as the sum of the individual subportfolio risks.

Brief Summary Text (8):
A significant problem with this approach, however, is presented by the last step. To illustrate, consider a simple example where a trader sells a call option on a given bond and immediately buys a hedge on the underlying bond. Although the bond clearly reduces the portfolio's risk, the above-described methodology would indicate that the VaR of the portfolio has increased (and in fact almost doubled). In general, a mix of methodologies may grossly overestimate VaR since it fails to account for the main principles of risk management: hedging and diversification. This may result in undesirable penalties for good risk management policies.

Brief Summary Text (9):
In view of the shortcomings with known approaches for risk management of large and/or complex portfolios, including but not limited to the shortcomings discussed above, it is apparent that there is a need for a computer-implemented process that is capable of representing such portfolios in a compact way, and that achieves such compression (e.g., loads instruments, generates cashflows, compresses, etc.) quickly and efficiently. Likewise, in contrast to the division approach discussed above, there is a need for a single methodology that enables measurement of risk

across an entire portfolio. Such a single methodology should offer sufficient computational efficiency to permit accurate risk measurement to be completed in a reasonable time period regardless of the size and/or complexity of the target portfolio. Embodiments of the present invention satisfy these and other needs.

Brief Summary Text (11):
The present invention is generally directed at providing improved tools for risk management of large and/or complex portfolios of financial instruments. In accordance with particular embodiments of the invention, as described herein, a "compressed portfolio" is generated for a given target portfolio of financial instruments. In general, the compressed portfolio is a relatively smaller and/or simpler portfolio that closely mimics the behavior of the target portfolio, but that requires orders of magnitude less computer memory to store and orders of magnitude less computational time to value. Thus, the compressed portfolio can be used, for example, for risk measurement analyses instead of the target portfolio, thereby providing substantial improvements in computer resource usage with little or no reduction in accuracy.

Detailed Description Text (2):
Embodiments of the present invention are directed to providing advanced portfolio tools for reducing the substantial computational requirements of modem portfolio management. In accordance with such embodiments, a "compressed portfolio" is generated for a target portfolio, and risk measurement calculations are then performed on the compressed portfolio. As used herein, the term "compressed portfolio" contemplates a relatively small and/or simple portfolio that behaves almost identically to an original large and/or complex portfolio, but that requires orders of magnitude less computer memory to store and orders of magnitude less computational time to value. For most purposes, a compressed portfolio need not mimic an original portfolio forever and under every possible state of the world, but rather only during a specified period of interest and over a range that certain specified market factors may take during that period. In addition to computational tractability, compressed portfolios are also powerful tools enabling risk managers to better understand and actively manage their portfolios. By representing portfolio behavior in simpler terms, one can gain insight into the exposures of large portfolios and identify possible remedial actions.

Detailed Description Text (3):
Embodiments of the present invention may be implemented, for example, using a so-called "compression engine." Given a target portfolio of financial instruments, a compression engine provides a means for creating a compressed portfolio consisting of simpler and/or fewer instruments that will replicate the behavior of the target portfolio over a range of possible market outcomes for a pre-defined period in the future. The computational effort to perform a risk analysis of the compressed portfolio is substantially less than that of the target portfolio. Furthermore, given its simplicity, the compressed portfolio provides a better understanding of the market risks facing the holder.

Detailed Description Text (4):
A general goal of such a compression engine is to preprocess a portfolio before attempting to simulate the portfolio's performance over a range of possible market scenarios. The product of this preprocessing stage is generally a smaller and simpler portfolio that is orders of magnitude faster to simulate, but that behaves almost identically to the original portfolio and contains the same risk.

Detailed Description Text (6):
To a limited extent, a compression engine in accordance with embodiments of the present invention may be used in a manner similar to the technique described above whereby an estimate of a portfolio's risk is determined by dividing the target portfolio and applying different techniques to each subportfolio. A principal difference, however, is that the portfolio compression techniques described herein

make it possible to avoid the problematic last step where the total risk is derived simply by summing the risks of the respective subportfolios. Here, the VaR of the target portfolio can be obtained by doing a single simulation of the "total compressed portfolio," given by the sum of the individual compressed portfolios. Thus, portfolio compression techniques such as those described herein fully capture portfolio diversification, hedging and correlations among individual positions.

Detailed Description Text (8):
Analytical compression is a practical and powerful methodology for the approximate representation of large cashflow portfolios that exploits their mathematical properties. The rationale behind analytical compression is relatively straight-forward. To calculate the distribution of portfolio values in the future using a standard simulation, scenarios are usually generated in "risk factor space" (i.e., input) without further information about the subject portfolio. Risk factor space refers to the space of all risk factors including, for example, interest rates, foreign exchange rates, volatilities, index levels, and so on. Thereafter, the portfolio is fully valued under all of those scenarios. Clearly, however, what the analyst is interested in is the portfolio's distribution (i.e., output). Hence, making use of the properties of the portfolio before sampling (i.e., before Monte Carlo generation) results in more efficient calculations. This has an effect similar to applying a variable transformation that captures the portfolio's properties. In addition to the compression of risk factor space, the exploitation of these underlying properties leads to a compact representation of the portfolio. Thus, the extra analytical work yields orders of magnitude increases in computational performance and substantial savings in terms of data storage requirements. In short, the results of analytical compression are (1) a new, compressed representation of a target portfolio by a small number of simple instruments (e.g., bonds) that depend on a new, smaller set of risk factors, and (2) an exact process that describes the behavior of the new underlying risk factors as a function of the original ones. The mathematical underpinnings of analytical compression are described below with reference to particular embodiments of the present invention. Further details can be found in Ron Dembo et al., Analytical Compression of Portfolios and VaR, Algorithmics Technical Paper No. 96-01 (1997), which disclosure is incorporated herein by reference.

Detailed Description Text (13):
In the present embodiment, processor 12 is capable of executing a compression engine 20 configured to perform portfolio compression. In this particular embodiment, compression engine 20 comprises a software module including executable instructions for carrying out various tasks and calculations related to portfolio compression, but persons skilled in the art will recognize that firmware- and/or hardware-based implementations are also possible. Compression engine 20 can be used, for example, to analyze the risk of a large and complex portfolio, or to analyze the performance of a number of hedges against potential losses for a given portfolio. The portfolio compression techniques taught herein are well-suited to such uses because of the improved processing speed and efficiency they provide.

Detailed Description Text (19):
After confirming the validity of the information conveyed in the received data packets using appropriate edit routines (not shown), the information describing the instruments in the target portfolio is subjected to a sort and divide routine 42 where instruments 38 are first divided into subportfolios according to a set of predefined user preferences, or "key attributes." Key attributes may include, for example, information such as a counterparty, a discount curve, and so on. In one particular implementation, sort and divide routine 42 implements a new portfolio hierarchy representing a desired level of portfolio aggregation that a portfolio manager, for example, wishes to use for overall risk analysis. These subportfolios may then be further sorted or subdivided according to the set of compression techniques, if any, that will later be applied to them. Such further processing is desirable where, for example, a single compression technique is not ideal for all

of the different types of financial instruments in the target portfolio.

Detailed Description Text (23):
In addition to analytical compression and scenario-based compression, compression routine 48 is preferably configured to be extensible, thereby allowing for the integration of other compression routines. Thus, in general, the input to compression routine 48 is a subportfolio that may be subjected to one or more available compression techniques. The particular techniques applied may be dictated, for example, by a user or by characteristics of the portfolio to be compressed. The compressed instruments might appear to be real traded instruments, but they do not necessarily have to be traded for purposes of risk management.

Detailed Description Text (24):
Finally, all of the subportfolios, both compressed and non-compressed, are passed to a second aggregation routine 50 to be combined into a single compressed portfolio 52. Compressed portfolio 52 can then be used, for example, as the basis for various risk assessment analyses of the target portfolio.

Detailed Description Text (25):
Looking more closely at some of the routines in the embodiment illustrated in FIG. 4, in one implementation sort and divide routine 42 is configured to divide the input target portfolio (or a portion of the target portfolio, in the case of incremental loading) into smaller subportfolios by, for example, a sorting process based on some user-defined set of key attributes. Each key attribute is associated with a particular feature or characteristic of a financial instrument, and serves as a sort key on which the collection of financial instrument information can be sorted. The judicious use of key attributes allows a user to refine the contents of each subportfolio to a level consistent with that user's particular risk management reporting objectives. A list of key attributes can be passed to sort and divide routine 42 using, for example, a GUI or a configuration file.

Detailed Description Text (26):
The use of key attributes provides a convenient way to tailor the operation compression engine 20 to particular uses. For example, key attributes can be used to cause sort and divide routine 42 to generate subportfolios that are particularly directed to the performance of credit risk reporting. In such an implementation, an input portfolio can be partitioned based on attributes such as (a) the legal entities that were the counterparties in the associated transactions, and (b) the jurisdictions where the transactions were booked. Application of these key attributes will result in the input portfolio being divided into subportfolios associated with different legal entities, and further being divided into subportfolios associated with different jurisdictions. These subportfolios could be further divided based on instrument type (e.g., option, fixed income). It should be noted, however, that such a sorting approach is presented by way of example only. The most advantageous key attributes for any particular implementation will vary, for example, in accordance with the particular reporting needs of a given institution or a particular type of risk analysis.

Detailed Description Text (28):
Referring again to the embodiment shown in FIG. 4, the input subportfolios to cashflow generation routine 44 are comprised of instruments that either generate only fixed cashflows or can be represented for valuation purposes as generating only fixed cashflows. Such instruments include, for example, fixed rate bonds, floating a rate notes, forward rate agreements, futures and forward contracts, foreign exchange forwards, fixed notional swaps and certificates of deposit. In many cases, cashflow instruments are advantageously represented in computer-implemented apparatus 10 in terms of their financial and accounting descriptions, and not directly as actual cashflows. Thus, cashflow generation routine 44 generates the cashflows of these instruments based on these financial descriptions. Nevertheless, for purposes of valuation, risk measurement and compression, it may

sometimes be desirable to represent these instruments by a series of cashflows occurring at certain times in the future, in which case their present value is equal to these cashflows discounted at appropriate rates. For example, a given fixed rate bond may be described by its maturity, notional, coupon rate and coupon frequency. Future cashflows can then be determined completely from this information, and its mark-to-market valuation can be obtained by discounting the future cashflows using current market rates. Again, however, the particulars may vary in accordance with the particular needs of any given implementation.

Detailed Description Text (29):
Turning now to first aggregation routine 46, as noted above this routine can be configured to generate a new type of instrument, called an aggregated cashflow instrument or ACI, for every interest rate curve. An ACI is simply a synthetic bond that pays the specified cashflows at the specified times. At this stage, all the generated cashflows that are discounted with the same discount curve are aggregated into a single ACI, and cashflows occurring on the same day are netted. The present value can thus be determined by discounting these cashflows using a single discount curve. For example, a portfolio consisting of 5000 fixed rate bonds in US dollars with maturities up to 10 years and paying semi-annual coupons would contain at most 100,000 cashflows. After aggregation, these would be represented by one ACI with at most 2500 cashflows (based on 250 business days per year). Since it is unlikely that these fixed rate bonds would have maturities covering every business day of the year, the actual number would generally be much less than this. Persons skilled in the art will recognize the substantial savings in terms of processing resources possible through such aggregation. Moreover, it should be noted that the subportfolio(s) output from first aggregation routine 46, containing those instruments that could not be represented by a fixed cashflow (e.g., options) and one or more aggregated cashflow instruments, has the same theoretical value and the same sensitivities to the previously-identified risk factors as the input subportfolio(s) since no approximations have been done. Other discounting approaches can alternatively be applied. The present invention is not limited in this regard.

Detailed Description Text (32):
The rationale behind analytical compression is relatively straight-forward. The basic approach is to seek a simpler space for approximating the portfolio with a set of basis functions, such that the stochastic process that the new risk factors follow can easily be found as a function of the original ones. In other words, the basic approach is to seek a lower-dimensional space for approximating the portfolio, such that the process of describing the portfolio price can easily be found as a function of the original risk factors. By expressing the portfolio in the right space and with the right functions, it is possible to achieve a reduction in dimensionality and a much smaller and simpler portfolio to process. By exploiting the functional properties of the portfolios and further using simulation techniques, the application of analytical compression provides substantial improvements in accuracy, and in flexibility, over known approaches to risk measurement, such as the "delta-normal" approach to estimating VaR popularized in J. P. Morgan's RiskMetrics.TM. methodology (see Riskmetrics.TM.--Technical Document, Morgan Guarantee Trust Company Global Research (4th ed. 1996)). Not only does analytical compression capture higher-order effects, such as convexity of bonds or gamma of options, but the resulting compressed portfolios can also be used directly in simulation with other complex derivative portfolios for on-line VaR calculations.

Detailed Description Text (33):
Analytical compression bears some resemblance to known principal component techniques, where the changes in the risk factor space are captured in a low-dimensional projection of the original space. However, the mapping obtained through analytical compression is not necessarily linear and it optimally accounts for the behavior of the portfolio. Moreover, as a "cashflow impression," analytical

compression goes much further than standard cashflow bucketing techniques (discussed below) where, for example, cashflows at given times are mapped to their duration equivalents on adjacent, predetermined nodes. Not only does analytical compression preserve the global properties of the portfolio more accurately, but it also offers at least an order of magnitude improvement in processing time. To further illustrate the analytical compression technique, the principles and theory of analytical compression are described below in the context of a particular implementation for fixed cashflow portfolios.

Detailed Description Text (34):
By way of background, and as noted above, the Value-at-Risk (VaR) of a portfolio represents the maximum level of losses that a portfolio could incur over some predetermined time period with a high confidence. More formally, VaR.sub..alpha. (t), the VaR with confidence level .alpha., for a period [0, t], is given by the solution of the equation

Detailed Description Text (35):
where V(R.sub.t, t) denotes the value of the portfolio at time t; R.sub.t represents the vector of underlying (stochastic) risk factors; and .alpha. (one-sided) is typically 0.9 to 0.99. The time interval is usually between 1 and 10 days.

Detailed Description Text (51):
where .sigma..sub.i represents the volatility of the i-th return, and the .rho..sub.ij are the entries in the correlation matrix. In matrix form this can be more compactly expressed as

Detailed Description Text (53):
It is important to emphasize that the differential process for the yield can be precisely known, given the joint process for the original risk factors (the individual rates, in this case). In principle, no approximation is required. For a more formal presentation of this observation, see Appendix 1 of Ron Dembo et al., Analytical Compression of Portfolios and VaR, Algorithmics Technical Paper No. 96-01 (1997), which discussion is incorporated herein by reference.

Detailed Description Text (62):
It can be shown that the volatilities and covariance of (y.sup.+, y.sup.-) are given by the following expressions ##EQU11##

Detailed Description Text (63):
The VaR of the portfolio can be computed through a Monte Carlo simulation on the two-dimensional space (y.sup.+, y.sup.-) and using Vas in Eq. 15. Given the low dimensionality and simple valuation, this is an effective computational technique. Furthermore, other low-dimensional integration techniques may be more effectively used in this case (e.g., low discrepancy sequences). Notice also that the property of strict monotonicity of Vin each risk factor, (y.sup.+, y.sup.-), can be exploited to accelerate simulations.

Detailed Description Text (64):
Consider now the case of a cashflow portfolio denominated in a different currency, thus having foreign exchange (FX) risk in addition to the interest rate (IR) risk. The value of the portfolio in the domestic currency can be expressed as ##EQU12##

Detailed Description Text (73):
Considering now a general multi-currency, multi-curve case, this can be solved by an iterated application of the above-described single currency case. Consider the general case of a global portfolio consisting of m subportfolios denominated in different currencies (the first of which is the domestic currency), where the portfolio contains IR risk factors. The value of the whole portfolio in the domestic currency can then be expressed as ##EQU16##

Detailed Description Text (74):
where k is used to index the currencies and S.sub.1 =1. The total dimension of the risk parameter space, in this case, is dim=.SIGMA.n.sub.k +m-1. When the number of IR risk factors in each subportfolio is given by a constant n.sub.r, then this simply becomes m(n.sub.r +1)-1. For example, a typical portfolio with 5 currencies and 16 term structure points (e.g., using the RiskMetrics.TM. term points), would then involve a problem with dimension 84:5*16 (IRs)+4 (FX). By applying the results of the previous section, the portfolio can be compressed to be valued as ##EQU17##

Detailed Description Text (75):
where the y.sub.k 's, C.sub.k 's, and t.sub.k 's denote the yields, coupons and durations of each subportfolio respectively. The dimension in this case is now dim=3m-1 (the 2m random yields (y.sub.k.sup.+, y.sub.k.sup.-), k=1, . . . m, and the m-1 FX spot rates S.sub.k, k=2, . . . , m). The risk factor space for the portfolio in the example above with 5 currencies would then be compressed to have dim=14. It should be noted that further simplifications are possible where the dimension can be reduced to 2 risk factors. This is accomplished, for example, by first applying Eq. 19 and then compressing all the resulting positive and negative cashflows into two cashflows using the yield approximation.

Detailed Description Text (77):
however, the techniques can also be used effectively for portfolios that contain floating instruments and derivatives. Methods such as the fixed notional method and approximations such as delta bucketing (see below) can be used to express most cashflow instruments in terms of fixed cashflows. Thus, the part of a portfolio without optionality, which typically accounts for 80-90% of the entire portfolio, can be compressed to a few positions, and the risk profile of the entire portfolio can be computed using a Month Carlo simulation. The computation in this case is much faster and retains full accuracy. This is in sharp contrast to a pure covariance (e.g., RiskMetrics.TM.) methodology where the substantial higher-order effects of derivatives, and even bond convexities, are not accounted for. Moreover, from a data processing perspective, analytical compression is ideal for batch processes, greatly enhances effectiveness of overall portfolio storage and loading/downloading, and releases vast amounts of memory for other processing.

Detailed Description Text (79):
Industry standards for bucketing of fixed income instruments include "duration bucketing" and the bucketing suggested in RiskMetricsT. Given a set of standard term nodes, both methods map each cashflow separately to the two (or one) closest nodes. Duration bucketing accomplishes this by matching the present value and the duration of the original cashflow. The bucketing described in RiskMetrics.TM. does this by matching present value and the volatility of the original cashflow. A further assumption of linear interpolation between the prices of zero coupon bonds is required. Additional information on these two bucketing techniques, including their relative advantages and disadvantages, can be found in the above-cited RiskMetrics.TM.--Technical Document and Mark B. Garman, Issues and Choices in Analytic (Variance-Covariance) Value at Risk (presented at the RIMAC 97 Conference, Scottsdale, Ariz., February 1997).

Detailed Description Text (80):
By contrast, delta bucketing provides a more powerful and robust technique than either duration bucketing or the RiskMetrics.TM. approach. Delta bucketing is generally applicable to all financial instruments, but is perhaps most appropriate for linear instruments. Delta bucketing aims to standardize the times at which cashflows occur. For fixed income instruments, delta bucketing reduces the number of cashflows in a portfolio by redistributing them over the standard term structure. This redistribution of the cashflows is done in a such a way that the partial derivatives (or key rate durations) of each individual instrument or cashflow with respect to each of the original risk factors is preserved.

Detailed Description Text (81):
The foregoing bucketing methods bucket each cashflow separately to the nearest nodes, without regard for the portfolio to which they belong. Hence, some global portfolio properties, such as its yield to maturity and duration, will not be preserved, because such properties are not additive. Preserving these properties for each individual cashflow does not guarantee that the property at the portfolio is preserved. By contrast, so-called "yield bucketing" maps all portfolio cashflows by preserving these global portfolio properties. In this way, cashflows are bucketed to standard nodes, accounting for all other cashflows in the portfolio, by assuring that the new bucketed portfolio preserves the same value, yield, and duration of the original portfolio. This is a desirable feature where the bucketing technique is to be used in conjunction with analytical compression, since the yield becomes the single risk factor that the portfolio depends on.

Detailed Description Text (82):
Turning now to the details of scenario-based compression, in accordance with a particular embodiment of the present invention, compression engine 20 can be configured to perform scenario-based optimization as follows. A portfolio or subportfolio to be compressed is passed to a cashflow and embedded option analyzer that returns a set of maturities for all instruments in the subportfolio, a set of underlying risk factors, and a range of strike prices for any embedded options.

Detailed Description Text (87):
FIG. 5 sets forth notation conventions that will be used in explaining further the technique of scenario-based compression. In addition, a superscript T will denote the transpose of a vector or matrix. Applying the convention described in FIG. 5, let q.sub.a =((q.sub.1).sub.a, (q.sub.2).sub.a . . . , (q.sub.N).sub.a).sup.T be the known values, at the start of the replication period, of attribute a (a=1, . . . , A) of each candidate instrument for the compressed portfolio. From time to time, we will drop the subscript "a" when a generic statement applying to any attribute is made.

Detailed Description Text (88):
Further, let D.sub.a be the S by N matrix that gives the possible values of attribute a (a=1, . . . , A) of each instrument in each scenario. That is, each entry (d.sub.ij).sub.a is the value of instrument j (j=1, 2, . . . , N) at the end of the replication period, if scenario i (i=1, 2, . . . , S) were to occur. Similarly, we assume the target portfolio has attributes valued at c.sub.a at the beginning of the replication period, and attributes valued at .tau..sub.a = ((.tau..sub.1).sub.a, (.tau..sub.2).sub.a, . . . , (.tau..sub.2).sub.a).sup.T (a=1, . . . , A) at the end of the replication period depending on which scenario(s) actually occur. A portfolio is characterized by the vector "x," with each component x.sub.j denoting the amount the portfolio contains of instrument j (j=1, 2, . . . , N).

Detailed Description Text (96):
In accordance with a variation on the above-described embodiments of the present invention, a compressed portfolio generated by, for example, compression engine 20 of the embodiment shown in FIG. 1, may be subjected to post-processing where the compression process generates instruments that depend on new risk factors (i.e., risk factors that were not present in the original, uncompressed target portfolio). These new risk factors may be provided, for example, by a market risk factors' distribution module. In accordance with this variation, a scenario generation module creates a set of scenarios based on these new risk factors, or alternatively adds the new correlated scenarios to an existing scenario set, after which the institution's risk profile can be calculated using the compressed portfolio and the new scenario set. Such post-processing is described further in the above-cited reference titled Analytical Compression of Portfolios and VaR, the pertinent disclosure of which is incorporated herein by reference.

Detailed Description Text (97):
For compression techniques such as analytical compression, the risk factor space will typically include some new variables (e.g., the compressed yields). To simulate the value of the global portfolios under changing market conditions, with both compressed portfolios and portfolios that are not compressed, scenarios must be generated from the joint distribution of the market factors and the new risk factors. These joint distributions are readily available from the yield sensitivities which describe the stochastic processes they follow (see the discussion of analytical compression above). If a scenario set in the original risk factors exists, each scenario is augmented to include the new risk factors (using, for example, Eq. 8, 9 and 16 above).

Detailed Description Text (103):
First, delta bucketing was applied to the portfolio containing the 143 cashflows, resulting in a reduction in the number of cashflows from 143 to 13. These 13 cashflows occur at the standard RiskMetrics.TM. term points, as discussed more fully in the above-cited RiskMetrics.TM.--Technical Document. Next, this reduced set of cashflows was passed to an analytical compression subroutine, and the positive cashflows were separated from the negative cashflows. In each instance (positive or negative) the yield was calculated and the cashflows were compressed to a single zero coupon bond. The output from compression routine 48 consisted of two zero coupon bonds--one with a positive notional and one with a negative notional. In addition, two new risk factors, based on the yield to maturity of each zero coupon bond, were created.

Detailed Description Text (104):
FIG. 6 shows the 13 cashflows produced using the delta bucketing compression technique. Note that a cashflow was created at the 15-year term point, which is three years past the longest maturing bond. FIG. 7 shows the cashflows of the compressed portfolio produced by applying the analytical compression technique to the result of the delta bucketing compression. Here, the first zero coupon bond created has a cashflow on Feb. 22, 1998 of (39,554,346.0729) USD, and the calculated yield is 5.1185%. The second zero coupon bond created has a cashflow of 60,098,278.9511 USD on Sep. 18, 2001, and the calculated yield is 5.5537%. The compressed portfolio consists of the two compressed bonds calculated as set forth above. Scenarios based on the two new yield risk factors were added to the original scenario set using a scenario generation routine, thereby enabling a VaR number to be calculated for the compressed portfolio.

Detailed Description Text (105):
To further demonstrate some of the advantages possible through application of such embodiments of the present invention, a comparison was made of 1-day VaR results based on the following risk management techniques:

Detailed Description Text (108):
(3) scenario-based VaR using the compressed portfolio and 1000 Monte Carlo scenarios on the compressed yield risk factors.

Detailed Description Text (112):
In both cases, as illustrated in Table 1 and Table 2, the Value-at-Risk obtained from the compressed portfolio differs from the Value-at-Risk obtained from the original portfolio by at most 1.22%, and is generally much closer. However, the time required to compress the portfolio and calculate the scenario-based VaR from the compressed portfolio varied from approximately 3% to 10% of the time required to calculate the scenario-based VaR from the target portfolio.

Detailed Description Text (119):
Each of the three subportfolios consisting of a single ACI was then compressed using delta bucketing and analytical compression. First, delta bucketing was

applied, resulting in at most 14 cashflows at the standard RiskMetrics.TM. term points. Next, this reduced set of cashflows was passed to an analytical compression subroutine and was separated into positive cashflows and negative cashflows. In each instance (positive and negative) the yield was calculated and the cashflows were represented by a zero coupon bond. The output from compression routine 48 was two zero coupon bonds--one with a positive notional, and one with a negative notional. In addition, two new risk factors, based on the yield to maturity of each zero coupon bond, were created. The six subportfolios that were passed through compression routine 48 (i.e., caps and swaptions in three currencies, fixed income instruments in three currencies) comprised the compressed portfolio. The entire process was then repeated until all of the instruments in the target portfolio were loaded and processed. Once there were no more instruments to be loaded, based on the six new yields that were created as risk factors during analytical compression, new scenarios were generated in a scenario generation routine, and these were added to the existing scenario set.

Detailed Description Text (131):
The foregoing is a detailed description of particular embodiments of the present invention. Persons skilled in the art will recognize, however, that many alternatives, modifications and/or variations of the disclosed embodiments are possible. For example, analytical compression and scenario-based compression are only two of a myriad of techniques that can be used to express portfolios in simpler form. Other techniques have already shown excellent practical results, including so-called Arrow-Debreu Compression, in which results of previous simulations are used to construct a new representation of a portfolio in a piecewise sense (using the analog of delta functions). Also available are so-called Power Series Methods, in which the portfolio value function is approximated by a local series expansion around the current mark-to-market price. These methods, in combination with harmonic analysis, provide an elegant and fast computational technique, as discussed in C. Albanese and L. Seco, Harmonic Analysis in Value at Risk Calculations, Working Paper, RiskLab-University of Toronto (1996) (accepted for publication in Finance and Stochastics). The present invention embraces all such alternatives, modifications and variations that fall within the letter and spirit of the claims, as well as all equivalents of the claimed subject matter.

Other Reference Publication (3):
Webb, Andrew. "VAR's Bean-Counter Dilemma". Treasury & Risk Management Technology Buyers' Guide, vol. 8, No. 6, pp. 53-54, 56, 1998.*

Other Reference Publication (4):
Spinner, Karen. "Hedging Credit, Market Risk". Wall Street & Technology Product Digest Supplement, pp. 23-25, Spring 1998.*

Other Reference Publication (5):
Groenfeldt, Tom. "Managing Risk in Real-Time: Is It Worthwhile?". Bank Technology News, Dec. 1, 1997.*

Other Reference Publication (16):
Ron S. Dembo and Alan J. King, "Tracking Models and the Optimal Regret Distribution in Asset Allocation," 8 Applied Stochastic Models and Data Analysis 151-157 (1992).

Other Reference Publication (18):
Ron Dembo and Izzy Nelken, "Share the Load," Risk, Apr. 1991.

Other Reference Publication (24):
Ron Dembo, "The Art of the Optimum," Risk, Apr. 1990, at 17-21.

Other Reference Publication (25):
Ron Dembo and Parvez Patel, "Protective Basket," Risk, Feb. 1990, at 25-28.

Other Reference Publication (32):
Planned Supplement to the Capital Accord to Incorporate Market Risks, Basle Committee on Banking Supervision, Bank of International Settlements, Basle, No. 16 (Apr. 1995).

Other Reference Publication (33):
Phillipe Jorion, Value at Risk: The New Benchmark for Controlling Derivatives Risk, 185-203 (Irwin Professional Publishing 1997).

Other Reference Publication (36):
W.F. Sharpe, Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk, The Journal of Finance, vol. 19, No. 3, 425-42 (1964).

Other Reference Publication (39):
Mark B. Garman, Issues and Choices in Analytic (Variance-Covariance) Value at Risk (presented at the RIMAC 97 Conference, Scottsdale, Arizona, Feb. 1997).

Other Reference Publication (41):
C. Albanese and L. Seco, Harmonic Analysis in Value at Risk Calculations, Working Paper, RiskLab-Univeristy of Toronto (1996) (accepted for publication in Finance and Stochastics).

CLAIMS:

1. A computer-implemented method for compressing a portfolio of financial instruments for purposes of portfolio management, the method comprising the steps of:

selecting one or more financial instruments to be compressed from among a plurality of financial instruments in an original portfolio;

generating a compressed subportfolio from the selected financial instruments, wherein said generating includes replacing a subset of the selected financial instruments with a synthetic financial instrument capable of replicating an aggregate behavior of the replaced subset;

combining the compressed subportfolio and any non-compressed financial instruments from the original portfolio into a compressed portfolio;

calculating a measure of risk for the compressed portfolio; and

performing risk management of the original portfolio based on the calculated measure of risk for the compressed portfolio.

11. A computer-implemented apparatus for generating a compressed portfolio corresponding to an original portfolio of financial instruments, the compressed portfolio being configured to replicate an aggregate behavior of the original portfolio when used to calculate a measure of risk for purposes of performing risk management of the original portfolio, said apparatus comprising:

a processor;

an input device coupled to said processor;

a memory coupled to said processor;

a compression engine including instructions executable by said processor, said instructions being configured to generate a compressed portfolio from an original portfolio comprising a plurality of financial instruments, wherein generation of

the compressed portfolio comprises generating a compressed subportfolio corresponding to one or more financial instruments selected from among the plurality of financial instruments in the original portfolio, said generating the compressed subportfolio including replacing a subset of the selected financial instruments with a synthetic financial instrument capable of replicating an aggregate behavior of the replaced subset, and combining the compressed subportfolio and any non-compressed financial instruments from the original portfolio into a compressed portfolio; and

an output device.

17. A computer-readable storage medium embodied in a computer and containing a set of instructions for causing a computer to compress a portfolio of financial instruments, said set of instructions including instructions for:

selecting one or more financial instruments to be compressed from among a plurality of financial instruments in an original portfolio;

generating a compressed subportfolio from the selected financial instruments, wherein said generating includes replacing a subset of the selected financial instruments with a synthetic financial instrument capable of replicating an aggregate behavior of the replaced subset;

combining the compressed subportfolio and any non-compressed financial instruments from the original portfolio into a compressed portfolio;

calculating a measure of risk for the compressed portfolio; and

performing risk management of the original portfolio based on the calculated measure of risk for the compressed portfolio.

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L15: Entry 12 of 17 File: USPT Aug 14, 2001

US-PAT-NO: 6275814
DOCUMENT-IDENTIFIER: US 6275814 B1

TITLE: Investment portfolio selection system and method

DATE-ISSUED: August 14, 2001

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APPL-NO: 08/ 757842 [PALM]
DATE FILED: November 27, 1996

INT-CL: [07] G06 F 17/60

US-CL-ISSUED: 705/36; 705/35
US-CL-CURRENT: 705/36; 705/35

FIELD-OF-SEARCH: 705/1, 705/35, 705/36

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
4346442	August 1982	Musmanno	364/408
4742457	May 1988	Leon et al.	364/408
4823265	April 1989	Nelson	364/408
5774881	June 1998	Friend et al.	705/36
5784696	July 1998	Melnikoff	705/36
5799287	August 1998	Dembo	705/36
5806047	September 1999	Hackel et al.	705/36
5806048	September 1998	Kiron et al.	705/36

☐	5806049	September 1998	Petruzzi	705/36
☐	5812988	September 1998	Sandretto	705/36
☐	5819238	October 1998	Fernholz	705/36
☐	5946667	August 1999	Tull, Jr. et al.	705/36
☐	5999918	December 1999	Williams et al.	705/36
☐	6003018	December 1999	Michaud et al.	705/36
☐	6021397	February 2000	Jones et al.	705/36

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
10-21294	January 1998	JP	
WO 96/06402	February 1996	WO	

OTHER PUBLICATIONS

Clarke et al: "Tracking errors, regret and tactical asset allocation"; Spring 1994, Journal of Portfolio Management, v20, n3, p. 16.*
Chow: "Portfolio selection based on return, risk, and relative performance"; Mar.-Apr. 1995, Financial Analysis Journal, v51, n2, pp. 54-60.*
Mellon Equity Associates: "Mellon Equity Associates, money manager, posts 1997 total assets managed of $11,312 mil"; Pensions & Investments, May 12, 1997, v25, n10, p. 81.*
Zhang: "Global asset allocation with multirisk considerations"; Fall 1998, Journal of Investing, v7, n3, pp. 7-14.*
"News & Comment", BNA's Patent, Trademark & Copyright Journal, vol. 49:325-326, Feb. 2, 1995 (citing Sage Products v. Devon Industries Inc., CAFC, No. 94-1274, Jan. 26, 1995).

ART-UNIT: 211

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ABSTRACT:

A set of available investment assets is evaluated for inclusion in an efficient portfolio by treating certain asset characteristics as a probabilistic random variable, and averaging the resultant portfolios at each risk level. Next, each candidate portfolio at each risk level is modified to more nearly match a preset industry sector/investment style profile thus producing a well diversified efficient portfolio well matched to a user's desired risk level.

8 Claims, 7 Drawing figures

L15: Entry 12 of 17 File: USPT Aug 14, 2001

DOCUMENT-IDENTIFIER: US 6275814 B1
TITLE: Investment portfolio selection system and method

Abstract Text (1):
A set of available investment assets is evaluated for inclusion in an efficient portfolio by treating certain asset characteristics as a probabilistic random variable, and averaging the resultant portfolios at each risk level. Next, each candidate portfolio at each risk level is modified to more nearly match a preset industry sector/investment style profile thus producing a well diversified efficient portfolio well matched to a user's desired risk level.

Brief Summary Text (2):
The present invention relates generally to computer systems for providing information to a user. The system includes financial modeling techniques, and an automated system for interacting with a user for computing and supplying asset recommendations to the user.

Brief Summary Text (4):
The 1990 Nobel Prize for Economics was awarded for work published in the 1950s on the "portfolio problem". The "portfolio problem" can be explained by considering two assets, A and B. Asset A has a particular risk and return associated with it. Asset B has a lower risk and a lower return. If an investor puts all his money into asset A he can expect the return and risk associated with the underlying asset. Similarly if he invests entirely in asset B he can expect the risk and return associated with that asset. However, what risk and return can be expected if he splits his investment between the two assets?

Brief Summary Text (5):
The return and risk of a portfolio containing both asset A and B is a function of the included assets but the relationship is not necessarily linear. In fact for most real world assets certain portfolios containing both asset A and asset B can exhibit a lower risk for a given return than either of the underlying assets. The benefit of this type of diversification follows from the fact that the financial performance of the two assets are not directly linked to each other and in general are imperfectly correlated. The optimal mix of asset A and asset B lies along a curve called the "efficient frontier". A methodology exists which can be used to compute the efficient frontier. The mathematics used to measure risk and return and to compute the frontier is discussed at length in numerous financial management textbooks, including Investments, authored by William F. Sharpe. However a brief explanation of the methods for measuring risk and return are useful to appreciate certain aspects of the present invention.

Brief Summary Text (6):
In general, each financial asset has an associated risk and a corresponding return which must be defined for purposes of computation. To compare two assets a standardized measure of risk and return must be developed. The texts define alpha, beta, market return and risk free return. Beta is a normalized measure of asset risk. An asset which "moves" exactly in proportion with the market has a beta of 1.0. An asset which moves only half as much as the market has a beta of 0.5. An asset which doesn't move at all has a beta of zero. Thus beta is a measure of the

covariance of an asset's return compared with the market. Risk free return is the measure of return of a risk free investment such as U.S. treasury bills (beta=approximately 0.0). Return is defined as the percentage change in wealth over the holding period for the asset. Alpha is a measure of the amount by which the return on an asset exceeds the return of a market benchmark having the same level of risk as the asset. Many texts describe alpha as how "mispriced" an asset is. Values for alpha are expressed as a percent per time period.

Brief Summary Text (7):
It is well known that an "efficient" portfolio can be combined with a risk free investment to create an optimal portfolio at any defined level of risk. FIG. 1 sets forth these relationships in a graphical fashion.

Brief Summary Text (8):
An efficient portfolio calculator can compute the efficient frontier for a portfolio of assets if the expected future values of these parameters are known or estimated. However, these efficient frontier calculations are quite sensitive to the values of the expected return attributed to the assets, as well to their correlation or covariance.

Brief Summary Text (9):
For example, a problem directly associated with the conventional computation of optimal or efficient portfolios, is that an implicit choice is made between two assets having nearly identical risk but slightly differing returns. In this case, the classic computation will typically select the highest return asset only for inclusion in the portfolio, even though its expected return is not known with precision.

Brief Summary Text (10):
It is also important to note that traditional efficient frontier calculations ignore, or accommodate only in an indirect fashion, other differences among assets having similar return and covariance attributes. For example, the industry sector grouping, or investment style (e.g. growth versus value) of the assets is not directly considered in creating the portfolio. Using the traditional efficient frontier calculation, a portfolio could be selected which lacks appropriate industry sector or investment style diversification, and which ignores assets with excellent but slightly suboptimal average expected returns. All of these shortcomings are undesirable.

Brief Summary Text (11):
Thus a straightforward or obvious application of traditional portfolio theory to the selection of mutual funds to form properly risk-targeted, well-diversified investment portfolios is problematic.

Brief Summary Text (13):
As set forth above the classic computation of the efficient frontier treats the expected return of each of the assets as a constant. In the present invention conventional portfolio computations are modified to permit the consideration of assets exhibiting a statistical variation in the value of the expected investment return. This permits the consideration and construction of multiple portfolios which lie in an efficient "zone" rather than on a precise efficient frontier. The methodology further refines the selection by averaging the set of zone portfolios to create a set of weighted average portfolios. The set of average portfolios is a benchmark that may be further modified in the methodology. For example the portfolio can be adjusted to ensure that a final recommended portfolio matches certain preset criteria which is illustratively set forth as the industry sector diversification of the market itself.

Brief Summary Text (14):
Unlike classically computed efficient portfolios the present methods evaluate

covariance, industry sector composition, and investment style (e.g. value versus growth, including P/E ratio and earnings growth rate) to compute portfolios which are not only very efficient, but are also appropriately diversified with respect to industry sector and investment style.

Brief Summary Text (15):
The preferred methodology of the present invention assumes an interaction with a user over a network such as the World Wide Web (WWW). For purposes of illustration the system and methodology is described in this Internet context with mutual funds as the only asset available for inclusion in the portfolio. It should be appreciated that other vehicles or techniques can be used to interact with users, and that other investment assets, such as individual stocks and bonds for example, can also be incorporated into the asset mix.

Drawing Description Text (5):
FIG. 3 is a plot of alpha for a single asset;

Detailed Description Text (2):
FIG. 1 shows a graphical representation of the prior art computation of an efficient set of portfolios based on two assets shown on the figure as point A and point B. This efficient set of portfolios can be combined with a risk free asset shown as point T to form a portfolio shown as point P which is made up from a mixture of asset A, asset B and asset T. This portfolio P has a risk shown as point RK and a return shown as point RT. Calculation of the frontier requires knowledge of the covariance matrix of the two assets, and an expected return for each asset. Most textbook presentations of this model use simple historical averages for each of these variables to compute the frontier. See for example Portfolio Selection by Harry M. Markowitz published by Yale University Press ISBN 0-300-01372-8 which is incorporated herein by reference, and note particularly the Appendix A which sets forth one technique for computing an efficient set.

Detailed Description Text (3):
FIG. 2 is a graphical representation of an efficient frontier calculation in accordance with the invention, where certain of the input variables have been treated as a random probabilistic variables in a Monte Carlo simulation. Monte Carlo simulation techniques are well known throughout the computer industry and will not be further described. In this case, an index model is used to calculate a series of statistically valid expected returns for each asset. The current implementation of the invention uses a single index model incorporating alpha, beta, and the expected return on the market. It should be noted that multiple index models can also be used with the invention, and the covariances among the assets can also be treated similarly as random variables as well. By letting the alphas and betas and market returns vary statistically, and computing the efficient portfolio hundreds or thousands of times, a cloud of points 11 is produced typified by portfolio point 12. This cloud forms an "efficient zone" that can be averaged to create a set of baseline portfolios along line 10. It is important to note that this baseline set of portfolios line 10 is not necessarily the same as the classic efficient frontier. As seen in the figure, for any given risk level typified by risk bin 13 there are multiple portfolios that lie on or near the baseline portfolio line 10. These alternative portfolios have different assets in differing weights, based upon the constrained random simulation incorporating alpha, beta, and the expected market return. Several efficient frontier calculation methods are available for the basic components of this type of calculation, and both specialized applications and spreadsheets can be used to implement the invention. The baseline portfolio line 10 is used to seed another computational model to further refine investment selection. For example portfolio point 14 lies on the average line 10 and is used to seed another computation giving rise to point 16 below the average line 10, and at the same risk level as portfolio point 14. One example of this process is discussed in connection with FIG. 4 and FIG. 5.

Detailed Description Text (5):
FIG. 3 is a chart displaying a time sequence of alpha values calculated for a single investment asset. The long term average value of alpha is shown as line 30 along with a 3 month moving average shown as line 32 and a six month moving average shown as line 34. It appears that at points on the graph where the 6 month moving average crosses the 3 month moving average alpha on the down slope (point 36) that the appropriate value of alpha for that asset should be lower than otherwise historically selected value. In a similar fashion if the 3 month and 6 month alphas cross on the upside (see point 38) then the appropriate value of alpha should be increased. This modification of alpha expectation or short term alpha prediction can improve the performance of the portfolios calculated to create the efficient zone 11 (see FIG. 1). This is just one of many methods for improving the near-term prediction of alpha. It should also be apparent that similar techniques can be used for the other input variables of the efficient frontier calculator without departing from the scope of the invention.

Detailed Description Text (6):
FIG. 4 is a table which shows one efficient portfolio computed at the 100 percent market risk level on the average line 10 at point 14. The assets in this portfolio are partitioned by percentages and the beta for the overall portfolio is shown in the table 19 (corresponding to box 18 in FIG. 2). In general the computation will proceed to compute corner portfolios in the conventional fashion and calculate the portfolios at other risk levels from the corner portfolios. There are two aspects of this portfolio that can be noted and which are addressed by the methodology. First the portfolio beta for the portfolio of point 14, which has been generated as the results of the previously discussed Monte Carlo simulation, is only 0.92 and it should be closer to 1.0 given the position of the portfolio along the risk axis. Second, the assets present in the portfolio are not necessarily appropriately diversified across industry sectors and investment styles. For example the given portfolio may be over or under invested in one or more industry sectors. It is one aspect of this methodology to force the recommended portfolio composition to reflect a preset or predefined industry sector and/or investment style profile. In the present implementation of the methodology the recommended portfolio is forced to more nearly match the industry sector diversification of the overall market itself. This may be accomplished in one of several ways including the use of the solver function of the Excel spreadsheet. In general a statistically efficient portfolio, for example the portfolio of point 14, is used to seed a solver spreadsheet which has industry sector and investment style diversification parameters set forth. The spreadsheet attempts to reallocate percentages of the investment assets to fit the portfolio within the desired diversification profiles, while at the same time maintaining the desired risk level and beta, as well as maximizing the expected return on the entire portfolio.

Detailed Description Text (7):
FIG. 5 is an example of a rebalanced portfolio shown as a table 17 which corresponds to the point 16 on FIG. 2. This portfolio in general has most or all of the same assets as the point 14 portfolio but alters the amounts to more nearly reflect the industry sector diversification of the market itself, or another pre-defined sector diversification profile.

Detailed Description Text (8):
The methodology described above can be used in a variety of ways. However it is expected that the intensive research and computation required to carry out the invention makes a network based implementation most advantageous. FIG. 6 shows a user 40 operating a computer 42 coupled to a remote computer 43 over a network 44. Such a network-based implementation also enables the user to interact in real time with the process, modifying assumptions (e.g. desired risk, sector/style balance, and expected market return), and receiving a revised portfolio to reflect these changes. The preferred approach is set forth in the flow chart of FIG. 7 which starts with a client interview at block 50. The client interview asks questions

which permit the appropriate selection of a risk bin for the client at an appropriate position along the risk axis. The client interview also determines which assets are available to the user for inclusion into portfolios. From the perspective of the invention it is important to note that all the funds or other assets are treated according to a uniform methodology to rank the funds with respect to investment style, diversification, beta, and P/E. The actual methodology used for the initial screening is less significant than the fact that all funds are treated the same. This involves a subjective selection of candidate mutual funds from the existing collection of over 6,000 mutual funds. This winnowing or screening process is automated to ensure that the selected set of mutual funds reflect those options which are available to the investor, e.g. in a 401 (k) retirement plan. Various subjective factors are evaluated as well. In general fund manager tenure and experience is evaluated. The size of the fund, expenses, its industry sector diversification and past performance versus risk incurred are all evaluated. The selection process reduces the candidate set of funds to approximately fifty to one hundred funds.

Detailed Description Text (9):
Next this set of funds is examined in detail. The alphas and betas are computed for these funds, based upon publicly available information. These computations are automated and are used to assign a return and a risk to each asset, which are then used in the modified Efficient Frontier simulation of FIG. 2. This portion of the process occurs in block 52. In block 54 the average portfolio used to seed the optimization process is formed as illustrated in FIG. 4.

Detailed Description Text (10):
In block 56 the optimization of portfolios across industry sectors and investment style are built for each of several defined risk levels and mutual fund programs. The user is then served with a recommended list of mutual funds which lie on or near the efficient frontier and are appropriately diversified across industry sectors and investment styles in block 58.

Detailed Description Text (11):
In use a user 40 may operate a network computer 42 having a browser application running. The user 40 is interrogated to determine the users perceptions and tolerance of risk in investment decisions. For example, the age of the investor and the investor's goals are evaluated. In this step the range of selectable assets is determined. For example the user or investor may have a 401 (k) retirement plan which allows the user to select between several funds within a fixed family of funds. This step can be performed face to face in the form of an interview, however it is preferable to collect this data on-line and interactively through a web site. The interview results in a placement of the user in a risk bin along the risk axis of FIG. 2 and further collects an exhaustive list of all assets that the user can buy. From the list of funds available to the user certain qualitative and quantitative data are collected and/or calculated at network computer 43 or computing machine according to the process shown in FIG. 7.

Detailed Description Text (12):
Although the present invention has used mutual funds as representative assets it should be clear that other asset types may be substituted. It is also important to recognize that the alpha prediction methodology can be accomplished in a variety of ways that fall within the scope of the invention. It should also be clear that the predictive methodology for beta and market return can be altered without departing from the scope of the invention.

Other Reference Publication (1):
Clarke et al: "Tracking errors, regret and tactical asset allocation"; Spring 1994, Journal of Portfolio Management, v20, n3, p. 16.*

Other Reference Publication (2):

Chow: "Portfolio selection based on return, risk, and relative performance"; Mar.-Apr. 1995, Financial Analysis Journal, v51, n2, pp. 54-60.*

Other Reference Publication (3):
Mellon Equity Associates: "Mellon Equity Associates, money manager, posts 1997 total assets managed of $11,312 mil"; Pensions & Investments, May 12, 1997, v25, n10, p. 81.*

Other Reference Publication (4):
Zhang: "Global asset allocation with multirisk considerations"; Fall 1998, Journal of Investing, v7, n3, pp. 7-14.*

CLAIMS:

1. A process for selecting an investment portfolio with the aid of a computing machine comprising the steps of:

a) selecting an initial set of assets;

b) predicting a value for alpha for each asset defining a parameter;

c) computing with a computer, a standard deviation of each alpha for each candidate asset defining a parameter;

d) computing with a computer a standard deviation of each beta for each candidate asset defining a parameter;

e) positing a market return for the market as a whole, and computing a standard deviation of the market return for a holding period defining a parameter;

f) computing with a computer the expected return of each asset over the holding period defining a parameter;

g) computing with a computer the covariance matrix of the assets defining a parameter;

h) applying the parameters to an efficient frontier calculator, to determine a set of corner portfolios based upon at least one of said parameters being treated as a random variable;

i) constructing a market line using the corner portfolio and the risk free asset;

j) identifying an average efficient portfolio for each of the multiple risk levels defined along the a risk axis, by specifying the weights of assets within each of said portfolios.

2. The process of claim 1 further comprising the step:

k) adjusting the weights of the assets in each efficient portfolio to optimize the level of industry sector and investment style diversification in the portfolio, so as to maintain the portfolio at a position on or near the efficient frontier and at the desired risk level.

3. The process of claim 1 wherein:

step b) is performed by comparing a relatively current alpha for each asset with a historical alpha for each asset and reviewing the short term versus long term alpha relationship to generate, and assign an expected alpha for each of said candidate assets.

4. A process for selecting an investment portfolio comprising the steps of:

a) interviewing a user through a local client software application to select an initial set of funds based upon criteria, wherein at least one criteria is selected from the set of;

i) industry sector;

ii) investment style;

iii) P/E ratio;

iv) earnings growth rate

v) fund manager tenure and experience;

vi) fund size;

vii) fund expenses;

viii) recent risk-adjusted performance

b) comparing a first current alpha for each fund with a historical alpha for each fund and determine the short term versus long term alpha relationship to generate a set of candidate funds, and assigning an expected alpha for each of said candidate funds;

c) computing a standard deviation of each alpha for each candidate fund;

d) computing a standard deviation of each beta for each candidate fund;

e) positing a market return and computing a standard deviation of the market return for a holding period;

f) computing the expected return of each fund over the holding period;

g) computing the covariance matrix of the assets;

h) applying the parameters to an efficient frontier calculator, to determine a set of corner portfolios based upon said parameters being treated as probabilistic random variables;

i) constructing a market line using the corner portfolio and the risk free asset;

j) identifying an efficient portfolio for multiple risk levels defined along the risk axis

k) adjusting the weights of the funds in each efficient portfolio to optimize the level of industry sector and investment style diversification in the portfolio, whereby the portfolio is maintain the portfolio at a position on or near the efficient frontier and at the desired risk level.

5. A process for selecting an investment portfolio for an investor comprising the steps of:

identifying a risk level for the investor, expressed in relation to market risk;

selecting an initial set of assets available to the investor for investment based upon at least the criteria of,

industry sector;

recent risk-adjusted performance;

computing and comparing a recent alpha for each asset with a historical alpha for each asset and comparing the short term versus long term alpha relationship to generate a set of candidate assets, and assigning an expected alpha for each of said candidate assets;

computing a standard deviation of each alpha for each candidate asset;

computing a standard deviation of each beta for each candidate asset;

positing a market return as a random variable and computing a standard deviation of the market return for a holding period;

computing the expected return of each asset over the holding period;

computing with an efficient frontier calculator, a set of corner portfolios based upon said parameters being treated as random variables to approximate observed real world returns;

constructing a market line using the corner portfolio and the risk free asset;

identifying an efficient portfolio at the risk level identified for the investor;

adjusting the weights of the assets in the efficient portfolio to optimize the level of industry sector and diversification in the portfolio, while maintaining the portfolio on or near the efficient frontier at the desired risk level.

6. A system for providing real time interactive investment advice to a user (40) comprising:

a network (44) including a computer (42) for use by a user (40) and a remote computer (43);

a client interview process (50) for selecting a set of assets available for investment, and for determining the appropriate risk level for the user;

a process (52) for computing a set of efficient portfolios for the assets;

a process (54) for computing average baseline portfolios for the assets; a process (56) for re balancing said set of portfolios to include assets in pre-defined industry sectors generating a portfolio with a risk value near said efficient portfolio;

a process for transmitting portfolio recommendations to said user (40).

7. The system of claim 6 wherein said client interview process (50) includes interrogation of users age, investor goals, and assets available for investment in a risk bin classification (13) for the user.

8. The system of claim 6 wherein process for re balancing includes selecting a less efficient portfolio (16) with approximately the same risk level of a more efficient portfolio (14) when said less efficient portfolio (16) exhibits more sector diversification, for presentation to said user (40).

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L21: Entry 32 of 43 File: USPT Aug 28, 2001

US-PAT-NO: 6282520
DOCUMENT-IDENTIFIER: US 6282520 B1

TITLE: Computer system and methods for allocation of the returns of a portfolio among a plurality of investors with different risk tolerance levels and allocation of returns from an efficient portfolio

DATE-ISSUED: August 28, 2001

INVENTOR-INFORMATION:

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APPL-NO: 09/ 150400 [PALM]
DATE FILED: September 9, 1998

INT-CL: [07] G06 F 17/60

US-CL-ISSUED: 705/36
US-CL-CURRENT: 705/36

FIELD-OF-SEARCH: 705/36

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
4566066	January 1986	Towers	364/408
4642768	February 1987	Roberts	364/408
4648037	March 1987	Valentino	364/408
4674044	June 1987	Kalmus et al.	364/408
4722055	January 1988	Roberts	364/408
4750121	June 1988	Halley et al.	364/408
4752877	June 1988	Roberts et al.	364/408

☐	4774663	September 1988	Musmanno et al.	364/408
☐	4839804	June 1989	Roberts et al.	364/408
☐	4933842	June 1990	Durbin et al.	364/408
☐	4942616	July 1990	Linstroth et al.	381/51
☐	4953085	August 1990	Atkins	364/408
☐	4969094	November 1990	Halley et al.	364/408
☐	5101353	March 1992	Lupien et al.	364/408
☐	5126936	June 1992	Champion et al.	364/408
☐	5148365	September 1992	Dembo	364/402
☐	5193056	March 1993	Boes	364/408
☐	5214579	May 1993	Wolfberg et al.	364/408
☐	5262943	November 1993	Earle	364/408
☐	5291398	March 1994	Hagan	364/408
☐	5414838	May 1995	Kolton et al.	395/600
☐	5631828	May 1997	Hagan	395/204
☐	5644727	July 1997	Atkins	395/240
☐	5673402	September 1997	Ryan et al.	395/238
☐	5745706	April 1998	Wolfberg et al.	395/235
☐	5752236	May 1998	Sexton et al.	705/4
☐	5806042	September 1998	Kelly et al.	705/4
☐	5819230	October 1998	Christie et al.	705/4
☐	5852811	December 1998	Atkins	705/36
☐	5864828	January 1999	Atkins	705/36
☐	5875437	February 1999	Atkins	705/40
☐	5878405	March 1999	Grant et al.	705/39
☐	5884285	March 1999	Atkins	705/36
☐	5911135	June 1999	Atkins	705/36
☐	5911136	June 1999	Atkins	705/36
☐	5926792	July 1999	Koppes et al.	705/4
☐	5930762	July 1999	Masch	705/7
☐	5991744	November 1999	DiCresce	705/36
☐	5999917	December 1999	Facciani et al.	705/36

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
3400-123	1985	DE	
53-76724	July 1978	JP	

58-144965	August 1983	JP
59-153259	September 1984	JP
3-65785	March 1991	JP
WO 95/06290	March 1994	WO

OTHER PUBLICATIONS

Gazis, D.C., "Real Estate Investment Analysis System," IBM Technical Disclosure Bulletin, vol. 13, No. 11, Apr. 1971 (pp. 3274-3275).
"Software at His Beck and Call, Manager's Bonds are Beautiful," Wall Street Computer Review, Jun. 1985 (pp. 9-12).
"Financial ES plans a complex future," AlWeek, Jun. 15, 1988.
Chapter 7--Optima Risky Portfolios of book titled "Investment" (pp. 192-233).
Bodie et al., Investments (3rd ed.). Irwin McGraw-Hill: Boston, 1996, (entire book).
Almgren, Robert and Neil Chriss, "Optimal Liquidation", pp. 1-37, Jan. 14, 1998.
Sivitanides, Petros, S., "Why Invest in Real Estate: An Asset Allocation Perspective", Real Estate Issues, vol. 22, No. 1, pp. 30-36, Apr. 1997.
Rabin, Bonnie R., "Total Compensation: A Risk/Return Approach", Benefits Quarterly, pp. 6-17, First Quarter 1995.
Michaud, Richard O., "The Markowitz Optimization Enigma: Is `Optimized` Optimal?", Financial Analysts Journal, pp. 31-42, Jan.-Feb. 1989.
HR Magazine, V.38, N11, Nov. 1993, "Helping Employees Invest Wisely," K. Ranftle, et al., pp. 77-82.
Anonymous, "GICs in a new guise," Institutional Investor, V28, N1, p. 138 (1/94).
Watson, Ronald D., "Does targeted investing make sense?" Financial Management, V23, N4, pp. 69-74 (Wntr '94).
Mylnechuk, Larry H., "GIC Fugure Guided by Participant Desire for Stable Asset," Pension World, V28, N5, pp. 21-23 (5/92).
Sellon, Gordon, "Changes in Financial Intermediation: The role of Pension and Mutual Funds," Economic Review, V77, N3, pp. 53-70 (Fall '92).
Rom, B. and Ferguson, K.W., "Post-Modern Portfolio Theory Comes of Age," The Journal of Investing, pp. 11-17 (Fall '94).
Vladimir de Vassal, "Negative Returns Valuable in Risk Assessment," no date.

ART-UNIT: 213

PRIMARY-EXAMINER: Hafiz; Tariq R.

ASSISTANT-EXAMINER: Meinecke-Diaz; Susanna

ATTY-AGENT-FIRM: Fulbright & Jaworski, LLP

ABSTRACT:

A method and system is presented for distributing returns from an investment portfolio to a plurality of investors with different risk tolerances as a function of the risk-return preferences of the investors. Said portfolio may correspond to a point on an efficient frontier related to the risk-return points selected by investors.

37 Claims, 7 Drawing figures

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L21: Entry 32 of 43 File: USPT Aug 28, 2001

DOCUMENT-IDENTIFIER: US 6282520 B1
TITLE: Computer system and methods for allocation of the returns of a portfolio among a plurality of investors with different risk tolerance levels and allocation of returns from an efficient portfolio

Abstract Text (1):
A method and system is presented for distributing returns from an investment portfolio to a plurality of investors with different risk tolerances as a function of the risk-return preferences of the investors. Said portfolio may correspond to a point on an efficient frontier related to the risk-return points selected by investors.

Brief Summary Text (2):
The present invention relates to computer systems and methods for allocation of investments and distribution of investment returns based on a risk return analysis of modern portfolio theory.

Brief Summary Text (5):
Ideally an investor should allocate his or her investment to achieve a maximum expected rate of investment return consistent with the investor's tolerance for risk. A portfolio that is suitable for a particular investor can be constructed by combining assets with different expected rates of return and different levels of risk.

Brief Summary Text (13):
Risk may be characterized in different ways. Probably the most common measure of risk is volatility, measured by standard deviation. Standard deviation is the square root of the variance of the returns of an asset or portfolio of assets. The variance is a measure of the extent to which the return on an asset or portfolio of assets deviates from an expected return. An asset with a higher standard deviation will be considered more risky than an asset with a lower standard deviation. Other measures of risk include semi-variance about a target return, which is a measure of the extent to which the return of an asset or portfolio of assets will fall below a target level of return. Another measure of risk is "value at risk," which is a measure of how much an asset or portfolio of assets can lose in value with a given probability.

Brief Summary Text (14):
The risk level of a combined portfolio of assets will depend on the risk measure used. For example, consider the risk associated with a combined portfolio using variance, or equivalently, standard deviation as the measure of risk. The standard deviation of the returns of a risk-free asset is zero whereas the standard deviation of the returns of a risky asset is greater than zero. Standard deviation is the square root of the variance. The variance is:

Brief Summary Text (19):
Combining a plurality of risky and risk-free assets in a portfolio will result in a portfolio with a standard deviation that is equal to or less than the weighted sum of the standard deviations of the component assets. For example, when two risky assets with variances .sigma..sub.1.sup.2 and .sigma..sub.2.sup.2, respectively,

are combined into a portfolio with portfolio weights w.sub.1, and w.sub.2, respectively, the portfolio variance, .sigma..sub.T.sup.2, is given by: ##EQU3##

Brief Summary Text (23):
The equation for the variance of the portfolio, .sigma..sub.T.sup.2, shows that a positive covariance increases portfolio variance beyond .SIGMA. w.sub.i.sup.2 .sigma..sub.i.sup.2. A negative covariance decreases portfolio variance. By investing in two assets that are negatively correlated, if one asset has a return greater than its expected return, that positive deviation should be offset by the extent to which the return of the other asset falls below its expected return.

Brief Summary Text (25):
Since the return of the combined portfolio is the weighted average of the returns of the component assets, portfolios of less-than-perfectly correlated assets always offer better risk return opportunities than the individual component securities. See, e.g., "Investments, 3rd Edition," p. 197, Bodie, Kane & Marcus, Irwin, McGraw Hill (1996). These results are true generally for a combined portfolio comprising numerous risky assets, for which the variance is given by: ##EQU4##

Brief Summary Text (28):
Given a set of imperfectly correlated risky assets, an innumerable set of combined portfolios can be constructed, each comprising different proportions of the component assets. An optimum portfolio is one in which the proportion of each asset comprising the portfolio results in the highest expected return for the combined portfolio for a given level of risk. Alternatively, an optimum portfolio is one in which the proportion of each asset comprising the portfolio minimizes the risk of the combined portfolio for any targeted expected return. See, e.g., "Investments, 3rd Edition," Bodie, Kane & Marcus, Irwin, McGraw Hill (1996).

Brief Summary Text (29):
This is illustrated in FIG. 1, using variance, or equivalently, standard deviation, as the risk measure. FIG. 1 is a graph of the minimum variance frontier of risky assets. This frontier is a graph of the expected risk and return of the portfolios with the lowest possible risk for given expected returns. This graph can be obtained by finding the set of weights for each component asset that will give the minimum variance for each targeted expected return.

Brief Summary Text (30):
The global minimum variance, Point A in FIG. 1, is the lowest variance that can be achieved, given the assets selected to comprise the portfolio. The portion of the minimum variance frontier that is concave downward, lying above and to the right of the global minimum variance, is called the efficient frontier. In FIG. 1, the efficient frontier is represented by the solid line above and to the right of Point A. The portion of the curve that is concave up from the global minimum variance represents inefficient points (portfolios), as there are points that lie directly above with higher expected return at the same level of risk (those points on the efficient frontier). In FIG. 1, these points are represented by the dashed line below and to the right of Point A.

Brief Summary Text (31):
In FIG. 2, the shaded area represents where the efficient frontier will always lie. Points A and B in FIG. 2 represent two portfolios on the efficient frontier. If the portfolios represented by Points A and B are perfectly positively correlated (.rho.=1), the efficient frontier curve is the solid line connecting Points A and B. This line is the weighted average of any combination of the two portfolios. If the portfolios represented by Points A and B are perfectly negatively correlated (.rho.-1), the efficient frontier curve is the dashed lines connecting Points A and B. This line shows that a certain combined portfolio of A and B will have a risk level equal to zero. For any portfolios A and B which are not perfectly correlated

(-1<.rho.<1), the efficient frontier curve must lie in the shaded area of FIG. 2, which is bordered by the perfectly positive and negative correlation lines. To lie in this shaded area between any two points on the efficient frontier, it must have the concave downward shape.

Brief Summary Text (32):
The efficient frontier is the curve that yields the highest expected return for a given level of risk. All other combinations of the assets selected to comprise the portfolio will result in a lower expected return for a given risk level. In particular, the risk-return plot of each individual asset will lie below and to the right of the efficient frontier. The efficient frontier represents the optimum risk-return opportunities available to an investor from a portfolio of risky assets.

Brief Summary Text (33):
Although variance is the measure of risk used to depict the efficient frontier in FIG. 1, an efficient frontier may be determined in terms of other risk measures as well. (See for example, "Post-Modern Portfolio Theory Comes of Age," B. Rom and K. Ferguson, The Journal of Investing, Fall 1994).

Brief Summary Text (34):
Ideally, a rational investor would choose to invest in a portfolio corresponding to the point on the efficient frontier that yields the highest expected return consistent with the investor's tolerance for risk. An investor who is highly risk averse should choose a point on the efficient frontier that provides a lower risk than an investor who is less risk averse. Consequently, the investor that is more highly risk averse will attain a lower expected return than would be attained by the less risk averse investor. Nevertheless, by choosing a portfolio that lies on the efficient frontier, each investor will attain the highest expected return attainable for a given level of risk. In practice, however, most investors lack the time, knowledge or inclination to perform the calculations required to construct a portfolio on an efficient frontier.

Brief Summary Text (35):
Many investment products available today offer the investor various risk-return choices. For example, an investor may choose among a finite set of portfolios, each comprising a different preselected mix of assets corresponding to a different risk preference. These products provide separate portfolios for each of a set of different risk preferences that may not lie on the efficient frontier. Similarly, investment products which allow an investor to select his or her own mix of various assets or portfolios will generally not result in a portfolio that lies on the efficient frontier. In short, investment products currently available to investors are suboptimal. They fail to provide the investor with the highest attainable expected return for a given level of risk. Also, current products do not pool investors with different risk tolerances to take advantage of diversification.

Brief Summary Text (36):
Therefore, what is needed is a system and method for allocating the returns from a single portfolio to a plurality of investors with different risk tolerances as a function of the preferred risk-return combinations chosen by the investors. Also, what is needed is a system that will provide to each investor risk-return opportunities that lie on or above an efficient frontier so that each investor will attain the highest achievable expected return for a given level of risk and the potential to earn more than the investor could have earned if the investor invested in an efficient portfolio on his or her own.

Brief Summary Text (38):
An object of the present invention is therefore to provide a system and methods for providing to participating investors risk-return opportunities that lie on or above an efficient frontier. Another object of the present invention is to provide a

system and methods for allocating the returns from a single portfolio to a plurality of investors with different risk tolerance levels as a function of the risk-return preferences chosen by the investors.

Brief Summary Text (39):
The present invention provides a method for distributing returns from an investment portfolio to a plurality of participants with different risk tolerances by allocating a portion of the portfolio return to each participant on the basis of a risk-return preference selected by the participant. The risk-return combination to be selected by each participant may be one of a plurality of points offered to the participants, each point corresponding to a different investment objective such as conservative, moderate, aggressive, etc. The present invention also provides a method for distributing returns from a portfolio lying on an efficient frontier, comprising the steps of determining a portfolio corresponding to a point on an efficient frontier and distributing returns from said portfolio among said participants. The point on the efficient frontier to which the portfolio corresponds is associated with risk-return points on the efficient frontier selected by the participants. The point on the efficient frontier to which the portfolio corresponds may be selected to correspond to a level of risk associated with risk levels selected by each participant. In particular, the point may be selected to correspond to a risk level equal to a weighted average of risk levels selected by each participant, where the weighting is based on the participant's share of the total value of the portfolio. Alternatively, the point on the efficient frontier to which the portfolio corresponds may be selected to correspond to an expected return associated with expected returns selected by the participants. In particular, the point may be selected to correspond to an expected return equal to a weighted average of the expected returns selected by each investor.

Brief Summary Text (40):
The returns from the portfolio are distributed to the participants according to a predetermined allocation function. The allocation function will allocate earnings based on each participant's selected risk level and expected return.

Brief Summary Text (41):
The present invention provides a system for distributing returns from an investment portfolio among a plurality of participants with different risk tolerances comprising: memory for storage of data representative of risk-return points selected by each of said participants; and a processor for: (a) determining the returns of the portfolio; and (b) determining a distribution of the returns to each participant as a function of the risk-return points selected by the participants.

Brief Summary Text (42):
The present invention also provides a system for distributing returns from an investment portfolio lying on an efficient frontier among a plurality of participants with different risk tolerances comprising: (a) memory storage for storing (i) data representative of investment risk and expected returns associated with assets in a group of selected assets; (ii) and data representative of risk-return points selected by each of said participants; and (b) a processor for (i) determining an efficient frontier from said data representative of said investment risk and said expected returns associated with said assets, (ii) determining a portfolio corresponding to a point on said efficient frontier, (ii) determining returns from said portfolio, and (iv) determining a distribution of said returns to each of said participants.

Brief Summary Text (43):
According to one aspect of the invention, a portfolio manager determines a portfolio of assets to be invested in by each of a plurality of participants, each with a different risk-return preference. Preferably this portfolio will lie on an efficient frontier of risk-return opportunities and each participant would select

their chosen risk-return preference point on the efficient frontier based on such factors as his or her risk tolerance, investment time horizon and financial situation. The portfolio manager would construct a portfolio that lies on the point of the efficient frontier that corresponds to the level of risk equal to the weighted average of risks levels chosen by each participant. The expected return of the portfolio so constructed will be greater than the weighted average of expected returns chosen by the participants. Alternatively, the portfolio manager could construct a portfolio that lies on the point of the efficient frontier corresponding to an expected return equal to the weighted average of the expected returns selected by the participants. The risk associated with a portfolio so constructed will be less than the weighted average of risk levels selected by the participants. The portfolio could also be constructed to be at other points on the efficient frontier.

Brief Summary Text (44):
The actual return of the efficient portfolio may be allocated to each participant based on the risk-return point selected by the participant. The present invention may allocate to each participant an optimal return for his or her investment given the participant s selected risk level and expected return.

Brief Summary Text (45):
The present invention incorporates various measures of risk including standard deviation, semi-variance about a target return and value at risk. The present invention further encompasses different allocation methods for optimally distributing the actual return of the efficient portfolio among participants.

Brief Summary Text (46):
The principles of the present invention maybe applied to any financial product that includes an investment component including mutual finds, variable annuities, variable universal life, 401(k) plans, etc. Another aspect of the present invention is the capability of providing guarantees with respect to the returns allocated to each participant. For example, a minimum rate of return each year or over a period of years can be provided. The guarantee could also be based on the return of other assets or an index such as the S&P 500. Further, these guarantees can vary according to selected risk levels and could be optional.

Drawing Description Text (2):
FIG. 1 is a graph of the minimum variance frontier of risky assets;

Drawing Description Text (4):
FIG. 3 is a plot of risk return points associated with portfolios on an efficient frontier;

Drawing Description Text (7):
FIG. 6 is a graph of the distribution of the return from an efficient portfolio based on each participant's selected risk level; and

Detailed Description Text (3):
The present invention provides a system for distributing returns from an investment portfolio among a plurality of participants with different risk tolerances comprising: memory for storage of data representative of risk-return points selected by each of the participants; and a processor for (a) determining the returns of the portfolio and (b) determining a distribution of the returns to each participant as a function of the risk-return points selected by the participants.

Detailed Description Text (4):
The present invention also provides a system for distributing returns from an investment portfolio lying on an efficient frontier among a plurality of participants comprising: (1) memory storage for storing (a) data representative of investment risk and expected returns associated with assets in a group of selected

assets (b) and data representative of risk-return points on an efficient frontier selected by each of said participants; and (2) a processor for (a) determining said efficient frontier from said data representative of said investment risk and said expected returns associated with said assets, (b) determining a portfolio corresponding to a point on said efficient frontier, (c) determining returns from said portfolio, and (d) determining a distribution of said returns to each of said participants. The participants may comprise individuals, institutional investors, corporations, employers or any combination thereof. The principles of the present invention maybe applied to any financial product with an investment component, including mutual funds, variable annuities, variable universal life, 401(k) plans, etc.

Detailed Description Text (6):
System manager 10 receives data from an input list 15, and utilizes this data to determine an efficient frontier, as will be described below. Input list 15 comprises the data required to determine the efficient frontier. This would include estimated expected returns for each of a set of N assets and the data specifying risk characteristics of the set of N assets and combinations of those assets. Input list 15 may further comprise expected returns and data specifying the risk characteristics for asset classes as well as individual assets. For example, if standard deviation is used as the measure of risk, input list 15 would include the estimated variance or standard deviation of each asset and estimates of the covariances, Cov(r.sub.i, r.sub.j), between each subset of two assets, (a.sub.i,a.sub.j), that can be formed from the set of N assets used to construct the efficient frontier. If a risk measure other than standard deviation is used, there are other ways that the risk characteristics of the assets can be specified. For example, a multivariate probability distribution function for the returns of the assets and all combinations of the assets may be specified, with expected returns and risks derived from the specified distribution function. Alternatively, a desired risk measure may be expressed as a function of the standard deviations and covariances of the assets. Various measures of risk for determining an efficient frontier and the input information necessary to compute these measures of risk are known in the art. (See for example, "Post-Modern Portfolio Theory Comes of Age," B. Rom and K. Ferguson, The Journal of Investing, Fall 1994).

Detailed Description Text (7):
The assets selected for inclusion in an efficient portfolio 30 to be constructed according to the present invention will typically be selected by human input based upon asset analysis. The expected returns and covariances of input list 15 are derived primarily from historical data and analysis of the various assets selected to compute the efficient frontier. The data of input list 15 may be derived or transferred to system 2 from an external database or other data storage. Alternatively, these data may be input to system 2 by means of a terminal comprising a keyboard and video monitor. The data of input list 15 may be stored in any compatible memory location such as random access memory, magnetic tape or other memory configuration.

Detailed Description Text (8):
System manager 10 also receives participant data from a participant data file 25. Participant data file 25 comprises an expected rate of return, .mu..sub.i, and a selected risk level, .xi..sub.i, selected by each participant, i. In a preferred embodiment, the risk-return combination selected by each participant corresponds to one of a plurality of points on an efficient frontier. Efficient frontiers are determined by system 2, as described below. Participant data file 25 would comprise the point on the efficient frontier chosen by each investor, each point being represented by a different number or other distinct symbol. Each symbol would correspond to an expected return and risk level chosen by the investor, and the actual expected return and risk level corresponding to the selected point need not be stored directly in participant data file 25. Participant data file 25 further comprises the amount, x.sub.i, invested by each participant, i. The amount x.sub.i

includes the principal invested by the i.sup.th participant plus any prior earnings of the i.sup.th participant to be reinvested, less any withdrawals.

Detailed Description Text (9):
The data of input list 15 is input to an optimization routine 20. Optimization routine 20 functions to determine an efficient frontier based upon the data of input list 15, by determining the portfolio weights, w.sub.i, that will yield the highest expected return for a combined portfolio of assets for a given level of risk. The portfolio weight, w.sub.i, is the proportion of the value of the i.sub.th asset to the total value of all assets to be included in efficient portfolio 30. Equivalently, optimization routine 20 functions to determine the optimum portfolio weights, w.sub.i, that yield the lowest level of risk for a combined portfolio for a given expected return. Optimization routine 20 may be implemented as a software subroutine that is called by system manager 10 whenever it is necessary or desirable to compute a new efficient frontier. Optimization routine 20 may be implemented using commercially available software that implements any suitable optimization algorithm. Alternatively, an optimization program could be developed by a person of ordinary skill in the art of optimization using, for example, linear or quadratic programming, to implement the functions of optimization routine 20.

Detailed Description Text (10):
Various measures of risk may be employed to determine an efficient frontier. For instance, if standard deviation is used as the measure of risk then optimization routine 20 would find the weights, w.sub.i, for each asset that maximize r.sub.T for each possible value of .sigma..sub.T.sup.2 in the following equations. ##EQU7## ##EQU8##

Detailed Description Text (11):
Alternatively, if another risk measure is used, for each value of that risk measure, weights, w.sub.i, would be found to maximize r.sub.T for each possible value of this chosen risk measure. a When semi-variance is used as the measure of risk, a single minimum acceptable return, r.sub.min, will be specified for efficient portfolio 30. Other measures of risk, such as value at risk, may also be employed to compute efficient frontiers to implement the present invention. It will be understood that the present invention may be implemented to offer participants a choice among a plurality of risk measures. In fact, it will be understood that the present invention may be used to determine multiple efficient frontiers, each corresponding to one of a plurality of risk measures selected by each participant. All participants choosing the same risk measure would be grouped together and would receive returns from an efficient portfolio corresponding to a point on an efficient frontier based on the common selected risk measure. In this embodiment, participant data file 25 would comprise each participant's selected choice of risk measure.

Detailed Description Text (12):
The output of optimization routine 20 is a set of risk-return points which define an efficient frontier. Associated with each risk-return point on the efficient frontier, is a unique set of weights, w.sub.i.sup.e, that yields a portfolio corresponding to that risk-return point. Each participant selects a point on the efficient frontier that corresponds most nearly to that participant's risk-return preference. Although, in one embodiment, an investor would be afforded the choice of any point on the efficient frontier, in a preferred embodiment, the investor is afforded a choice of one of a plurality of pre-selected points. Thus, for example, the investor may be offered a choice of one often points on the efficient frontier. The participant would then choose the point closest to his or her own risk-return preference. The expected return and risk level corresponding to the point chosen by each participant, or, alternatively, a symbol representing the chosen point, is input to participant data file 25. It will readily be understood that in the alternative to offering each participant a choice of points on the efficient frontier, each participant could be offered a choice of one of a plurality of

investment objectives, such as conservative, moderate, aggressive, etc., which correspond to different risk-return opportunities. Each investment objective could correspond to a different point on an efficient frontier, with each such point corresponding to a mix of assets expected to produce the chosen investment objective.

Detailed Description Text (13):
System manager 10 selects an operating point on the efficient frontier. The operating point may be a predetermined point chosen independently of the efficient frontier points selected by the participants. In a preferred embodiment, however, an operating point is chosen that is associated with the risk-return points selected by the participants according to an operating point selection function. The operating point on the efficient frontier selected by system manager 10 may be selected to correspond to a level of risk associated with risk levels selected by each participant. In particular, the operating point may be selected to correspond to a risk level equal to a weighted average of risk levels selected by each participant. Alternatively, the operating point on the efficient frontier selected by system manager 10 may be selected to correspond to an expected return associated with expected returns selected by the participants. In particular, the operating point may be selected to correspond to an expected return equal to a weighted average of the expected returns selected by each participant. It will be understood that the present invention may be implemented to offer participants a choice among a plurality of operating point selection functions. In fact, it will be understood that the present invention may be used to construct multiple efficient portfolios, each portfolio corresponding to a point on an efficient frontier selected by one of a plurality of operating point selection functions chosen by each participant. All participants choosing the same operating point selection function would be grouped together and would receive returns from an efficient portfolio according to their common selected operating point function. In this embodiment, participant data file 25 would comprise each participants selected choice of operating point function.

Detailed Description Text (16):
In one embodiment, the operating point selection function is implemented by system manager 10 to compute a weighted average risk level, .xi..sub.T, or a weighted average expected rate of return, .mu..sub.T, based on participant data from participant data file 25. For example, system manager may compute .xi..sub.T as follows: ##EQU9## ##EQU10##

Detailed Description Text (21):
Referring to FIG. 5, system manager 10 will then construct an efficient portfolio 30 that lies on the efficient frontier at an operating point, B, corresponding to the computed value of .xi..sub.T, or at an operating point, C, corresponding to .mu..sub.T. A portfolio corresponding to point B will be a portfolio that provides an expected return that is greater than the weighted average of the expected returns selected by the participants at a risk level that is equal to the weighted average of risk levels selected by the participants. A portfolio corresponding to point C will result in a portfolio that provides an expected return that is equal to the weighted average of expected returns selected by the participants at a risk level that is lower than the weighted average of risk levels selected by the participants. Other operating points could be chosen.

Detailed Description Text (26):
The present invention comprises a method of allocating returns from a single portfolio to a plurality of participants according to each participant's selected risk-return preference. A variety of allocation functions could be implemented by allocation module 50. In fact, it will be understood that the present invention may be used to construct multiple portfolios, each portfolio return being distributed to its participants according to a different pre-specified allocation function. Indeed, the present invention may be implemented to allow each participant to select his or her preferred allocation function. All participants choosing the same

allocation function would be grouped together and would receive returns from an efficient portfolio according to their common selected allocation function. In this embodiment, participant data file 25 would comprise each participant's selected choice of allocation function.

Detailed Description Text (27):
Generally, the rate of return, r.sub.i, allocated to each participant, may be expressed as some function of the expected rate of return and risk level chosen by each participant. That is, r.sub.i =f(.mu..sub.1, .mu..sub.2, .mu..sub.3 . . . . .mu..sub.P, .xi..sub.1, .xi..sub.2, .xi..sub.3 . . . . .xi..sub.P). One such allocation function is:

Detailed Description Text (28):
where (.mu..sub.i, .xi..sub.i) are the expected percentage return and risk level chosen by the i.sup.th participant. The actual dollar amount of return, R.sub.i, received by each participant is:

Detailed Description Text (32):
Consider for example an efficient portfolio at operating point B in FIG. 5, where the expected return is greater than the weighted average of expected returns selected by the participants and the risk level of the portfolio is equal to the weighted average of risk levels chosen by the participants. Choosing d=1 results in: ##EQU14##

Detailed Description Text (33):
Since the expected return amount of efficient portfolio 30 is greater than .SIGMA.b.sub.i.mu..sub.i, the expected value of c, c, is greater than zero. Notice, however, that the variance of c is equal to 1: ##EQU15##

Detailed Description Text (34):
Each participant receives a rate of return in a given allocation period of r.sub.i =.mu..sub.i +c.multidot..xi..sub.i and an amount b.sub.i r.sub.i. The expected value of r.sub.i,E(r.sub.i) is equal to .mu..sub.i +c.xi..sub.i, which is greater than .mu..sub.i, since c>0. Further, since Var(c)=1, the standard deviation of r.sub.i =.xi..sub.i. Therefore, each participant receives a return that has the same risk level as chosen by the participant but an expected return that is higher than the expected return chosen by the participant. This distribution is illustrated in FIG. 6. According to this allocation method each participant can expect to receive a rate of return that is a function of his or her selected level of risk. If an investor selects a high level of risk, he or she will receive a greater share of the deviation of the actual return from the expected return, positive or negative. For example, if the actual return of portfolio 30 falls below the average expected return of participants, then participants who chose a higher level of risk would incur a greater amount of the deficiency than participants who chose a lower risk level. Conversely, if the actual return of portfolio 30 is above the expected return then participants who chose a higher risk level would receive a greater amount of the excess than participants who chose a lower risk level. Consider now, an efficient portfolio at operating point C in FIG. 5. Then, c=0 and Var(c)<1. In this case, each participant receives a return that has the same expected value as selected by the participant but with a lower risk level.

Detailed Description Text (36):
Then, c=0 with variance equal to 1. Each participant will receive a rate of return, r.sub.i =d.mu..sub.i +c.xi..sub.i. The expected rate of return per participant is therefore d.mu..sub.i >.mu..sub.i with standard deviation .xi..sub.i. According to this allocation method, each participant's expected rate of return is a function of the ratio of the expected return of portfolio 30 to the weighted average of returns selected by the participants. This is illustrated in FIG. 7. Other allocation methods can be implemented by allocation module 50. The rates of return for each participant, r.sub.i, and the dollar amount of the return for each participant,

R.sub.i, will be recorded in a system memory and allocated to the participants. The participant return, may then be transferred electronically to a memory location corresponding to an account of the participant. The amount of the participant's return, R.sub.i, will be algebraically added to the participant's investment amount and any withdrawals will be subtracted from the participant's investment amount.

Detailed Description Text (38):
Periodically, the operating point of the efficient frontier must be redetermined. This will occur whenever a new participant is admitted, deposits or withdrawals are made, or a participant changes his or her point on the efficient frontier. Periodically, efficient portfolio 30 must be redetermined to reflect changes in the assets comprising the portfolio and changes in the expected risks, returns, and correlations of the assets comprising the portfolio.

Detailed Description Text (39):
When different assets are to be included in efficient portfolio 30 it is necessary for optimization routine 20 to redetermine the efficient frontier based on a new input list 15. The present invention may be implemented to provide guarantees with respect to the returns allocated to each participant. For example, a minimum rate of return each investment period or over a series of investment periods can be provided. The guarantee can also be tied to the rate of return of other assets or an index such as the S&P 500. Further, these guarantees can vary according to risk levels selected by the participants. Guarantees can be optional for each participant. When guarantees are provided the risk that the actual return for each participant falls below the guaranteed level is absorbed by the provider of the efficient portfolio.

Other Reference Publication (1):
Gazis, D.C., "Real Estate Investment Analysis System," IBM Technical Disclosure Bulletin, vol. 13, No. 11, Apr. 1971 (pp. 3274-3275).

Other Reference Publication (8):
Rabin, Bonnie R., "Total Compensation: A Risk/Return Approach", Benefits Quarterly, pp. 6-17, First Quarter 1995.

Other Reference Publication (15):
Rom, B. and Ferguson, K.W., "Post-Modern Portfolio Theory Comes of Age," The Journal of Investing, pp. 11-17 (Fall '94).

Other Reference Publication (16):
Vladimir de Vassal, "Negative Returns Valuable in Risk Assessment," no date.

CLAIMS:

1. A computer-implemented method for distributing returns from an investment portfolio to a plurality of participants, comprising the steps of:

forming a portfolio of assets corresponding to an operating point on an efficient frontier determined in accordance with risk-return preferences specified by the participants having varying risk-return preferences;

distributing returns from the portfolio among the participants according to an allocation function of said risk-return preferences specified by the participants.

2. The method of claim 1, wherein the operating point on the efficient frontier is a function of risk-return points selected by the participants.

3. The method of claim 1, wherein the operating point on the efficient frontier corresponds to a level of risk equal to a weighted average of risk levels selected by each participant.

5. A system for distributing returns from an investment portfolio among a plurality of participants comprising:

memory storage for:

storing data representative of risk-return preferences specified by each of the participants; and

a processor for:

determining a portfolio of assets corresponding to an operating point on an efficient frontier in accordance with the risk-return preferences specified by the participants having varying risk-return preferences;

determining the distribution of the returns from the portfolio to each of the participants according to an allocation function of the risk-return preferences; and

distributing the returns from the portfolio among the participants.

6. The system of claim 5, wherein the operating point on the efficient frontier is a function of risk-return preferences specified by the participants.

7. The system of claim 5, wherein the operating point on the efficient frontier corresponds to a level of risk equal to a weighted average of the risk-levels selected by each participant.

9. The system of claim 5, wherein said returns are distributed as a function of risk return points chosen by the participants.

14. The method of claim 1, wherein the allocation function provides each participant a return that deviates from the participant's chosen expected return by an amount proportional to the risk level chosen by the participant.

16. A method for distributing returns from an investment portfolio to a plurality of participants, comprising the steps of:

forming a portfolio of assets corresponding to an operating point on an efficient frontier; and

distributing returns from the portfolio among the participants according to an allocation function of risk-return preferences chosen by the participants;

wherein the allocation function provides each participant an expected rate of return, r.sub.i =d.mu..sub.i +c.xi..sub.i, where .mu..sub.i is the expected rate of return chosen by the i.sup.th participant and .xi..sub.i is the risk level chosen by the i.sup.th participant, and: ##EQU17##

R.sub.T.sup.e is the actual return of the portfolio, and b.sub.i is the i.sup.th participant's balance in the portfolio; and

the actual return, R.sub.i, allocated to each participant is given by:

R.sub.i =db.sub.i.mu..sub.i +cb.sub.i.xi..sub.i.

17. A method for distributing returns from an investment portfolio to a plurality of participants, comprising the steps of:

forming a portfolio of assets corresponding to an operating point on an efficient

frontier; and

distributing returns from the portfolio among the participants according to an allocation function of risk-return preferences chosen by the participants;

wherein the allocation function provides each participant an expected rate of return, r.sub.i =d.mu..sub.i +c.xi..sub.i, where .mu..sub.i is the expected rate of return chosen by the i.sup.th participant and .xi..sub.i is the risk level chosen by the i.sup.th participant, and: ##EQU18##

R.sub.T.sup.e is the actual return of the portfolio, R.sub.T.sup.e is the expected return of the portfolio and b.sub.i is the i.sup.th participant's balance in the portfolio; and

the actual return, R.sub.i, allocated to each participant is given by:

R.sub.i =db.sub.i.mu..sub.i +cb.sub.i.xi..sub.i.

18. The method of claim 1, wherein each different risk-return preference corresponds to a different point on the efficient frontier.

22. The system of claim 5, wherein the allocation function provides each participant a return that deviates from the participant's chosen expected return by an amount proportional to the risk level chosen by the participant.

24. A system for distributing returns from an investment portfolio among a plurality of participants comprising:

memory storage for:

storing data representative of risk-return points selected by each of the participants; and

a processor for:

determining a portfolio of assets corresponding to an operating point on an efficient frontier;

determining the distribution of the returns from the portfolio to each of the participants according to an allocation function of the risk-return points; and

distributing the returns from the portfolio among the participants

wherein the allocation function provides each participant an expected rate of return, r.sub.i =d.mu..sub.i +c.xi..sub.i, where .mu..sub.i is the expected rate of return chosen by the i.sup.th participant and .mu..sub.i is the risk level chosen by the i.sup.th participant, and: ##EQU19##

R.sub.T.sup.e is the actual return of the portfolio, and b.sub.i is the i.sup.th participant's balance in the portfolio; and

the actual return, R.sub.i, allocated to each participant is given by:

R.sub.i =db.sub.i.mu..sub.i +cb.sub.i.xi..sub.i.

25. A system for distributing returns from an investment portfolio among a plurality of participants comprising:

memory storage for:

storing data representative of risk-return points selected by each of the participants; and

a processor for:

determining a portfolio of assets corresponding to an operating point on an efficient frontier;

determining the distribution of the returns from the portfolio to each of the participants according to an allocation function of the risk-return points; and

distributing the returns from the portfolio among the participants

wherein the allocation function provides each participant an expected rate of return, r.sub.i =d.mu..sub.i +c.xi..sub.i, where .mu..sub.i is the expected rate of return chosen by the i.sup.th participant and .xi..sub.i is the risk level chosen by the i.sup.th participant, and: ##EQU20##

R.sub.T.sup.e is the actual return of the portfolio, R.sub.T.sup.e is the expected return of the portfolio and b.sub.i is the i.sup.th participant's balance in the portfolio; and

the actual return, R.sub.i, allocated to each participant is given by:

R.sub.i =db.sub.i.mu..sub.i +cb.sub.i.xi..sub.i.

27. The system of claim 5, wherein each different risk-return preference corresponds to a different point on the efficient frontier.

28. A computer implemented method for distributing returns from each one of a plurality of investment portfolios to a respective one of a plurality of groups of participants, comprising the steps of:

forming for each group of participants a portfolio of assets corresponding to an operating point on an efficient frontier determined in accordance with risk-return preferences specified by each participant having varying risk-return preferences in the group;

distributing for each portfolio the returns from the portfolio among the participants in the group for which the portfolio was formed according to an allocation function of the risk-return preferences specified by each participant in the group.

29. The method of claim 28, wherein the operating point for each portfolio is a function of the risk-return points of the participants in the group for which the portfolio is formed.

33. A computer implementated method for determining a distribution of returns from an efficient portfolio to a plurality of participants comprising the steps of:

specifying a risk-return preference by each participant;

selecting an allocation function in accordance with the risk-return preferences specified by each participant having varying risk-return preferences;

computing and allocating a return for each participant in accordance with the allocation function.

35. A computer-implemented method for determining a distribution of returns from an efficient portfolio to a plurality of participants, comprising the steps of:

determining a risk level and expected rate of return for each participant; and

computing for each participant an expected rate of return, r.sub.i =d.mu..sub.i +c.xi..sub.i, where .mu..sub.i is the expected rate of return chosen by the i.sup.th participant and .xi..sub.i is the risk level chosen by the i.sup.th participant, d and c are chosen to satisfy the following equation: ##EQU21##

where R.sub.T.sup.e is the actual return of the portfolio, and b.sub.i is the i.sup.th participant's balance in the portfolio; and

allocating the returns to each participant, wherein the actual return, R.sub.i, allocated to each participant is given by:

R.sub.i =db.sub.i.mu..sub.i +cb.sub.i.xi..sub.i.

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L6: Entry 34 of 41 File: USPT Jan 27, 2004

US-PAT-NO: 6684193
DOCUMENT-IDENTIFIER: US 6684193 B1

TITLE: Method and apparatus for multivariate allocation of resources

DATE-ISSUED: January 27, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chavez; Thomas A.	San Francisco	CA		
Dagum; Paul	Menlo Park	CA		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Rapt Technologies Corporation	San Francisco	CA			02

APPL-NO: 09/ 412560 [PALM]
DATE FILED: October 5, 1999

INT-CL: [07] G06 F 17/60

US-CL-ISSUED: 705/8; 705/7
US-CL-CURRENT: 705/8; 705/7

FIELD-OF-SEARCH: 705/8, 705/7, 703/2, 703/6, 700/28

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
4744026	May 1988	Vanderbei	705/8
4744027	May 1988	Bayer et al.	705/7
4744028	May 1988	Karmarkar	705/8
4894773	January 1990	Lagarias	705/7
4914563	April 1990	Karmarkar et al.	700/28
4924386	May 1990	Freedman et al.	705/8
5185715	February 1993	Zikan et al.	708/801
5630070	May 1997	Dietrich et al.	705/8

☐	5970465	October 1999	Dietrich et al.	705/7
☐	6138103	October 2000	Cheng et al.	705/7

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0 356 191	February 1999	DE	

OTHER PUBLICATIONS

Hillier et al., "Introduction to Operations Research", McGraw-Hill, Inc., 1995, 6th Edition, pp. 26-28, 38-43, 82-90, 134, 153-158, 164-174, 558-562, and 568.*
Edirisinghe, Nalin Chanaka Perera, "Essays on Bounding Stochastic programming problems", Disertation Abstracts Internation, 1991 [retrieved 10/10/02], vol.53/12-B, p.6379, 1 page, Retrieved from: Dialog.*
Dintersmith, Ted, "A seperating Choice Hyperplane algorithm for evaluating multiattribute decisions", Operations Research, Nov./Dec. 1984 [retrieved on 10/10/02], vol.32, No. 6, p 1328, 1 page, Retrieved from: Dialog.*
Dagum et al., "Time series prediction using belief network models", International Journal of Human-Computer Studies, Jun. 1995 [retrieved 04/07/03], vol. 42, 1 page, retrieved from: Dialog, file 99.*
Dagum et al., "Polytopes, permanents, and graphs with large factors", IEEE, 1988 [retriebed 04/07/03], 1 page, retrieved from: Dialog, file 2.*
Alanyali, Murat, "Analysis of some simple policies for dynamic resource allocation", Dissertation Abstracts International, 1996 [retrieved 04/07/03], vol. 57/10-B, 1 page, retrieved from: Dialog, file 35.*
Manugistics, Inc., "Statgraphics plus", www.statgraphics.com, Dec. 1998 [retrieved 04/03/03], 13 pages, retrieved from: archive.org and google.com.*
Van Roy, Benjamin, "Learning and Value Function Approximation in complex decision processes", Dissertation Abstracts International, 1998 [retrieved 04/07/03], vol.59/10-B, pages1-2, retrieved from: Dialog, file 35.

ART-UNIT: 3623

PRIMARY-EXAMINER: Hafiz; Tariq R.

ASSISTANT-EXAMINER: Van Doren; Beth

ATTY-AGENT-FIRM: Campbell Stephenson Ascolese LLP Campbell, III; Samuel G.

ABSTRACT:

A method and apparatus providing for an efficient solution to the multivariate allocation of resources are described. A model is formulated that derives the relationship between a set of resources and a set of refinements, wherein any of a number of resources are used to build or comprise a refinement. The model provides for at least: the resource consumption as based upon the relationship between each refinement and its set of supporting resources, a demand distribution of the refinements, and a value function. Each resource, and the refinements that it supports, generates a resource hyperplane in a demand space, and the complete set of refinements generates an intersecting set of hyperplanes forming a polytope on which resource allocation fulfills refinement demand. An expected value function is thereafter formulated and transformed into a closed form solution.

26 Claims, 26 Drawing figures

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L6: Entry 40 of 41 File: USPT Dec 28, 1999

US-PAT-NO: 6009402
DOCUMENT-IDENTIFIER: US 6009402 A

TITLE: System and method for predicting, comparing and presenting the cost of self insurance versus insurance and for creating bond financing when advantageous

DATE-ISSUED: December 28, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Whitworth; Brian L.	Malibu	CA	90265	

APPL-NO: 08/ 901762 [PALM]
DATE FILED: July 28, 1997

INT-CL: [06] G06 F 17/60

US-CL-ISSUED: 705/4; 705/400
US-CL-CURRENT: 705/4; 705/400

FIELD-OF-SEARCH: 705/1, 705/4, 705/36, 705/400

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
4642768	February 1987	Roberts	705/4
4722055	January 1988	Roberts	705/36
4752877	June 1988	Roberts et al.	705/35
5590037	December 1996	Ryan et al.	705/4
5712984	January 1998	Hammond et al.	705/4

ART-UNIT: 271

PRIMARY-EXAMINER: Cosimano; Edward R.

ATTY-AGENT-FIRM: Oppenheimer Wolff & Donnelly LLP

ABSTRACT:

A system and method for predicting, comparing, and presenting the cost of self insurance versus insurance for property, casualty, or employee benefit liabilities, and for creating bond financing when advantageous. For a self insured entity, the cost of insurance is estimated by reviewing available data from actuarial studies, claims audits, loss runs, similar self insureds, recent similar insurance deals and rating agencies. These preliminary pricing estimates are used to decide if pursuing insurance is likely to provide savings to the self insured. Suggested pricing estimates are also provided to facilitate marketing the program to insurance carriers. If a carrier offers an insurance program which provides savings and the insured entity requires bond financing, the system is adapted to calculate bond payments based on budget constraints or claims payout patterns.

69 Claims, 40 Drawing figures

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L6: Entry 41 of 41 File: USPT Sep 1, 1998

US-PAT-NO: 5802499
DOCUMENT-IDENTIFIER: US 5802499 A

TITLE: Method and system for providing credit support to parties associated with derivative and other financial transactions

DATE-ISSUED: September 1, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Sampson; Gerald P.	Luxembourg			LU
Strauss; Melvin	Great Neck	NY		
Tyson-Quah; Kathleen	London			GB
Haddock; Jorge	Clifton Park	NY		
Sime; Thomas S.	Luxembourg			LU

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Cedel Bank	Luxembourg			LU	03

APPL-NO: 08/ 501901 [PALM]
DATE FILED: July 13, 1995

INT-CL: [06] G06 F 17/60

US-CL-ISSUED: 705/35
US-CL-CURRENT: 705/35

FIELD-OF-SEARCH: 395/235, 395/236, 395/237, 395/238, 395/239, 395/380, 705/35, 705/36, 705/37, 705/38, 705/39

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
5285383	February 1994	Lindsey et al.	395/237
5375055	December 1994	Togher et al.	
5497317	March 1996	Hawkings et al.	

☐ 5563783 October 1996 Stolfo et al. 395/236

FOREIGN PATENT DOCUMENTS

FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
0512702	November 1992	EP	
9428496	December 1994	WO	
9618160	June 1996	WO	

OTHER PUBLICATIONS

Hybrid Instrument Transaction Service, Hybrid Instrument Service, cir. 1995.
"Collateralization Becomes More Important In Derivative Transactions, But Legal Roadblocks Must Be Removed (or Avoided)" by Takuhide Mitsui and Kunsen Gen, Derivatives, Mar./Apr. 1996, 6 pages.
"OTC Overtures", Clearing & Settlement, May/Jun. 1995, 2 pages.
"All Clear For Swaps?", International Financial, May 31, 1995, 2 pages.
"Proposal For A Swaps Clearing House/Swaps Depository", by the Chicago Board of Trade Clearing Corporation, May 18, 1995, 4 pages.
"A Long Unwinding Road", by Mark Johnson, Futures & Options World, May 1995, 2 pages.
"Managing Collateral On Exchanges and Off: A New Perspective" by Todd E. Petzel, The Journal of Derivatives, Spring 1995, 9 pages.
"Swaps Depository Deal Welcomed As A Timely Move" by Richard Metcalfe, Banking Technology, Feb. 1995, 1 page.
"Private-Sector Initiatives for Swaps Taking Shape" by Laurie Morse, 2 pages.
"Collateral Co-Operation", International Financial Products, Dec. 14, 1994, 1 page.

Swap Service Bureau, Chicago Board of Trade Clearing Corporation, Dec. 14, 1994, 8 pages.
"CME To Centralise Trade In Swaps Deals", The Financial Times, Dec. 9, 1994, 1 page.
"Survey of Global Custody: Custodians Face Rising Demand--Derivates--The Growth of the Industry" by Richard Lapper, The Financial Times, Nov. 29, 1994, 2 pages.
"International Capital Markets: Study Calls For Exchange to Clear OTC Contracts--Derivatives", by Richard Lapper, The Financial Times, Nov. 17, 1994, 2 pages.
"Cedel In Talks on Collateral For OTC Derivatives" by Adam Bradbery, The Dow Jones Capital, Jun. 13, 1994, 2 pages.
"Mark-to-Market Arrangements" by Joseph H. Levie, et al., New York Law Journal, Apr. 7, 1994, 4 pages.
"The Potential for Clearing House Arrangements in the OTC Derivatives Market" by the Chicago Board of Trade Clearing Corporation, Mar. 11, 1994, 13 pages.
"All The World's A Stage" by Mark Harding and Barry Yin, Clearing Business, 1993, 3 pages.
"Reducing Credit Risk In Over-The-Counter Derivatives" by John P. Behor, Federal Reserve Bank of Chicago, Circa 1995, 11 pages.
"CME Swaps Collateral Depository Report".
"Hybrid Instrument Transation Service (HITS) Overview", Hybrid Instrument Service, Circa 1995, 6 pages.

ART-UNIT: 271

PRIMARY-EXAMINER: Weinhardt; Robert A.

ASSISTANT-EXAMINER: Voqui; Thanh-Hang

ATTY-AGENT-FIRM: Hopgood, Calimafde, Kalil & Judlowe

ABSTRACT:

A computer-based information network for managing credit exposure between counterparties to a plurality of credit support agreements. The network comprises information storage and processing systems. The systems store various types of information including information representative of assets of counterparties to a plurality of credit support agreements for use in covering credit exposures therebetween over a specified time period, and the plurality of credit support agreements. The systems process the information representative of the assets in order to effectively reflect a movement of certain of the assets to cover the credit exposures over the specified time period. An asset movement optimization process is used for determining an optimal movement of certain of said assets to cover credit exposures over the specified time period.

10 Claims, 66 Drawing figures

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